# PART 2.

# TEXTILE MACHINERY

## Relating to

# WEAVING

by

E. A. POSSELT

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Consulting Expert on Textile Designing and Manufacturing.

*Author and Publisher of "Technology of Textile Design," "Structure of Fibres, Yarns and Fabrics," "The Jacquard Machine Analyzed and Explained," "Textile Calculations," "Posselt's Textile Library," Editor of "The Textile Record," Editor of Textile Terms in "Standard Dictionary," and "Iconographic Encyclopædia of the Arts and Sciences," Principal of "Posselt's Private School of Textile Design," formerly Headmaster of the Textile Department of the Pennsylvania Museum and School of Industrial Art, Philadelphia.*


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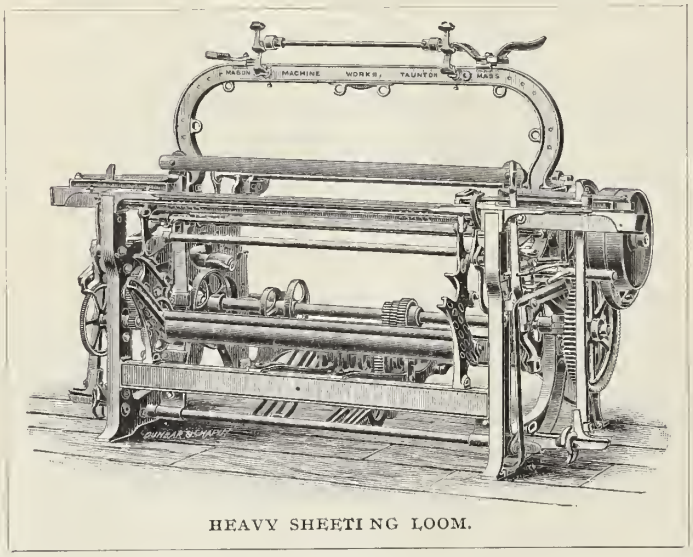


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# PREFACE.

THE present book is issued, according to my promise in Part I, to keep machinery relating to weaving up to date before the public. The new book does not infringe with said Part I, treating only such modern machinery and devices needed in the weaving department of an up to date mill as came to my notice since Part I was published.

It is my intention to issue a third volume, three years hence, giving a description of such machinery and devices as will be brought in the market from now until then, in order to keep the subject of modern machinery relating to weaving constantly up to date before the public.

Parts I and II combined, form thus far the most valuable manual to every Textile Manufacturer, Superintendent, Designer, Overseer and Student who wants to keep in touch with the latest and most improved machinery, etc.

Illustrations and reading matter have been most carefully prepared and no time, labor or money spared to bring the various subjects as plain as possible before the reader.

E. A. POSSELT.

PHILADELPHIA, PA., 1901.

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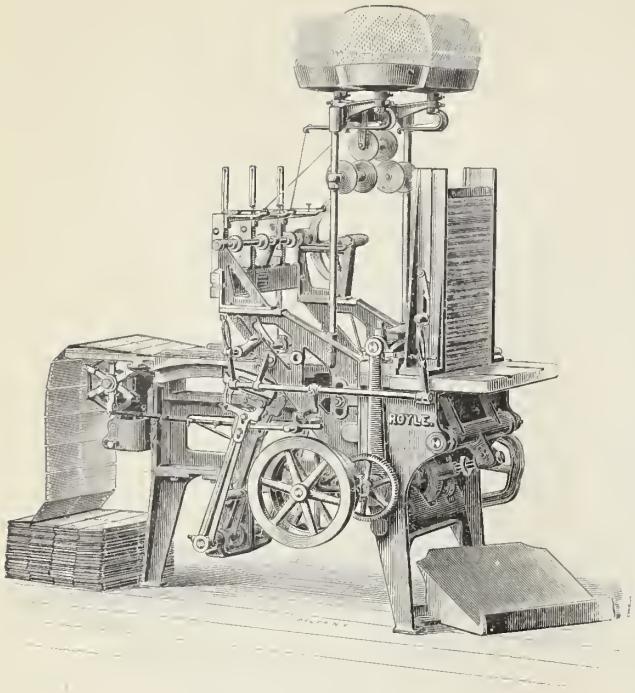


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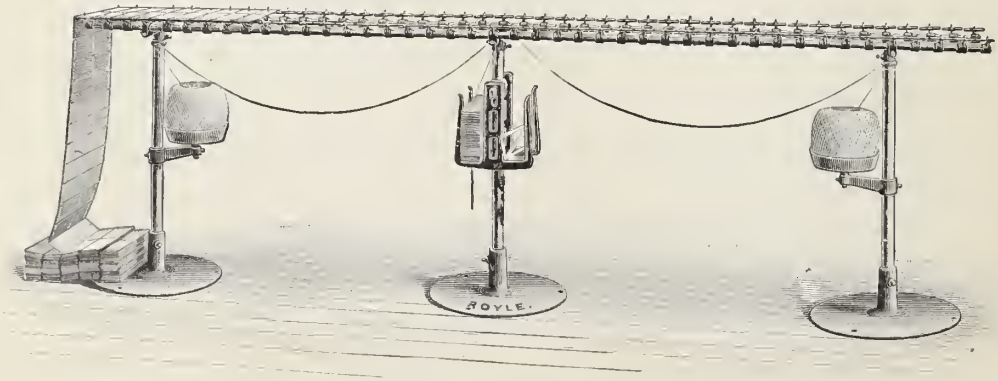



HAND LACING FRAME.

# SHEDDING MECHANISMS.

## HARNESS CHAIN MULTIPLIER FOR KNOWLES LOOMS.

The object of the device is to do away with the long pattern chains required for weaving certain fabrics, as towels, with a plain body and headings, and to use a short pattern chain, which is moved in one direction or the other, as desired, and for the length of time desired, according to the pattern to be woven; in this manner permitting the use of a chain with a small number of bars for weaving the pattern desired.

In the illustrations there is shown in connection with the new mechanism a portion of a drop box pattern mechanism and of a multiplier pattern chain, both being of the construction illustrated and described on pages 10, 11 and 12 of "Textile Machinery Part I" under the heading "Mechanism for Operating Shedding and Drop Box Pattern Indicators for Knowles Looms." There is also shown in the illustrations in connection with the new mechanism, a portion of a dobby pattern chain mechanism of the construction illustrated and described on pages 14, 15 and 16 of "Textile Machinery Part I," under the heading "Shedding Mechanism for Fabrics Produced by Two Weaves."

Fig. 1 is a plan view of portions of a drop box pattern mechanism of the description shown on pages 10-12 of Part I, and a portion of the pattern cylinder and its driving mechanism of a double index dobby mechanism of the description shown on pages 14-16 of Part I. Fig. 2 is, on an enlarged scale compared to Fig. 1, a horizontal section through the reverse gears shown at the lower right hand corner of Fig. 1, showing the sliding reverse key in its outward position. Fig. 3 corresponds to Fig. 2, but shows the opposite position of the sliding reverse key. Fig. 4 is an end view of the reversing gear mechanism.

1 indicates the dobby frame, 2 the shaft of the dobby pattern cylinder 3 which is provided with a series of longitudinal grooves 4 in which extend the bars 5 of the pattern chain of which only one is shown.

The pattern chain 5 is provided with two rows of holes 6, arranged alternately to receive the pattern pins, which act on the indicator levers (not shown) of the dobby and thus control the movement of the harness frames.

The end of the dobby pattern cylinder shaft 2 has a worm gear 7 loose thereon, which is held to turn with the shaft 2 by a spring actuated clutch device 8 consisting of a spring actuated arm or dog 8′, pivoted at one end on a plate 8″, the hub 8‴ of which is fast on the shaft 2. A coiled spring 9 bearing at one end against a collar 10, fast on the end of the shaft 2, and at its other end against the arm or dog 8′, acts to keep said dog 8′ in engagement with the lugs 7′ on the worm gear 7, so that the revolution of the gear 7 will revolve the shaft 2 of the pattern cylinder 3. The shaft 2 can be turned by hand if desired, the dog 8′ slipping by the lugs 7′ on the worm gear 7 and the spring 9 contracting, so that the shaft 2 and the pattern cylinder 3 may be turned in either direction independently of said worm gear 7.

Secured to the dobby frame 1 are three arms or brackets 11, 11′, 11″, which support the drop box pattern mechanism and also the shafts carrying the system of gears. The driving shaft 12 extends only between the frames 11 and 11′ and is about half the length of the two other shafts. (See Fig. 1, dotted lines.) Gear 13 connects the new mechanism with some driven part of the loom.

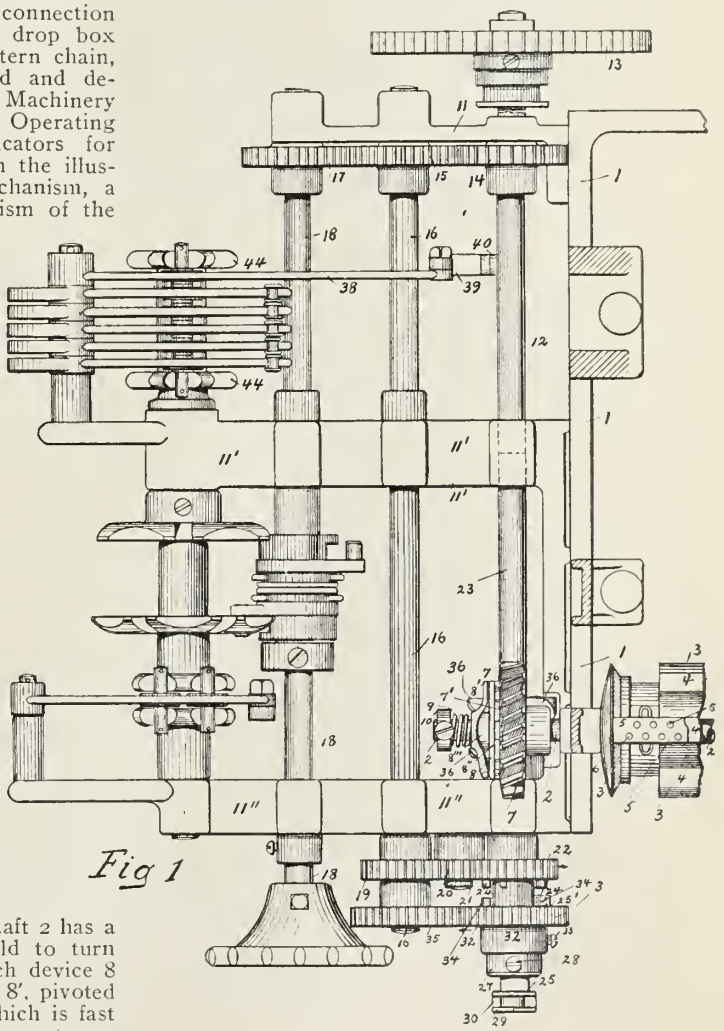


Fig 1

The shaft 12 has a gear 14 thereon which meshes with a gear 15, fast on a shaft 16, and drives said shaft 16. The gear 15 also meshes with a gear 17, fast

on the shaft 18 of the drop box pattern mechanism, and drives said shaft 18.

On the shaft 16 is fast a gear 19, which meshes with a gear 20, loose on stud 21. The gear 20 meshes with a gear 22, loose on a shaft 23, which is

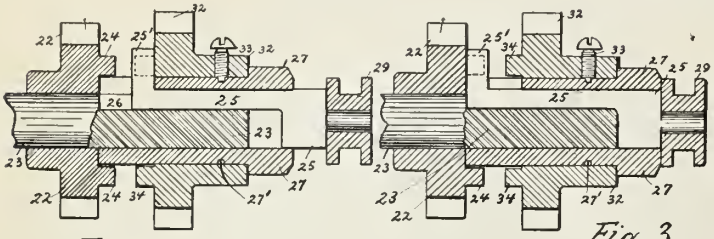


Fig. 2



Fig. 3

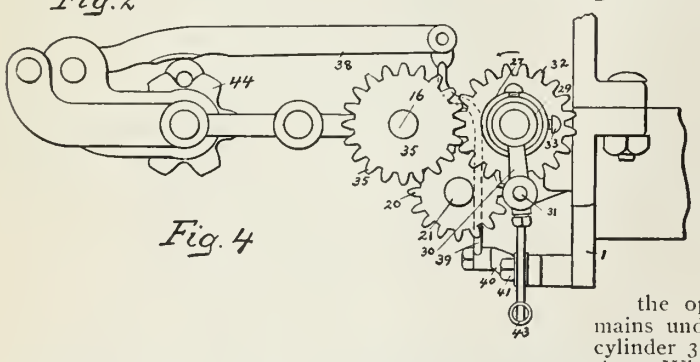


Fig. 4

in alignment with the shaft 12. The gear 22 has two pins 24 on opposite sides thereof, which are adapted to be engaged by the projecting end 25′ of the sliding key 25 to cause the shaft 23 to turn with the gear 22 when desired. The sliding key 25 (see Figs. 2 and 3) extends and is adapted to have a longitudinal motion in a slot 26 in the shaft 23 and to turn with said shaft. A collar 27, secured on the end of the shaft 23 by a set screw 28, holds the sliding key 25 in the slot 26 in said shaft. On the outer end of the sliding key 25 is secured a grooved pulley 29, into which extends the yoked end of an arm 30, secured on the end of the longitudinal sliding shaft 31.

On the collar 27 in the end of the shaft 23 is loosely mounted a gear 32, which is provided with a set screw 33, the inner end of which extends in an angular groove 27′ in the collar 27, to hold the gear 32 in proper position thereon.

The gear 32 is provided with two pins 34, on opposite sides thereof, which are adapted to be engaged by the projecting end 25′ of the sliding key 25 to cause the shaft 23 to turn with the gear 32. With the gear 32 meshes a gear 35, fast on shaft 16.

On the shaft 23 is fast a worm 36, which extends below and engages and turns the worm gear 7 on the shaft 2 of the pattern cylinder 3. The worm 36 has a dwell of one-half a revolution, at which time the sliding key 25 is given its longitudinal motion; but the worm 36 having a whole revolution each pick, the worm gear 7, and dobby pattern cylinder 3 are made to turn every pick of the loom with the other half of the worm.

By means of a two weave device (shown on pages 14-16 of Part I) the indication may be taken from either row in bar 5 to make the pattern perfect on the goods. In some weaves the pegging of bar 5 used in going forward would not indicate right on the reverse of the chain, in which case the second row of holes would be used in bar 5, it being understood that one row of holes only may be used in bar 5 or a bar with a single row may be used, as desired.

The automatic movement of the reverse key 25 through sliding rod 31 is controlled and regulated by an additional finger or lever 38 over the drop box pattern chain cylinder 44. A link 39 connects the outer end of the lever 38 with an angle lever 40. The opposite end of the angle lever 40 engages with a collar on the sliding shaft 31. A spring 43, secured to a projection on the angle lever 40 below its pivot point 41, acts to draw the sliding rod 31 in, and the reversing key 25 into engagement with the pins 24 on the gear 22, as shown in Fig. 3. With the key 25 in this position the dobby pattern cylinder 3 will continue to revolve in one direction; but when a roll on the box pattern chain comes under the lever 38, said lever is raised, and through the connector 39, angle lever 40, sliding rod 31, and arm 30, the key 25 is moved outwardly into the position shown in Fig. 2 to engage with the pins 34 on the gear 32 and cause said gear to revolve with said shaft 23, leaving the gear 22 loose on said shaft. The shaft 23 will then be revolved in an opposite direction through the gear 35, fast on the end of the shaft 16, and likewise the dobby pattern chain cylinder 3 will be revolved in the opposite direction. As long as the roll remains under the lever 38 the dobby pattern chain cylinder 3 will continue to revolve in the same direction. When a roll does not come under the lever 38, said lever will drop and the spring 43 will act to move the sliding rod 31 and through connections the key 25 to engage with the pins 24 on the gear 22 and cause the dobby pattern chain cylinder 3 to turn in the opposite direction. Thus the dobby pattern chain is alternated or turned forward or backward automatically, as desired, and for the length of the pattern desired. *(Crompton and Knowles Loom Works.)*

## THE CROMPTON HARNESS LEVELING DEVICE FOR DOBBIES.

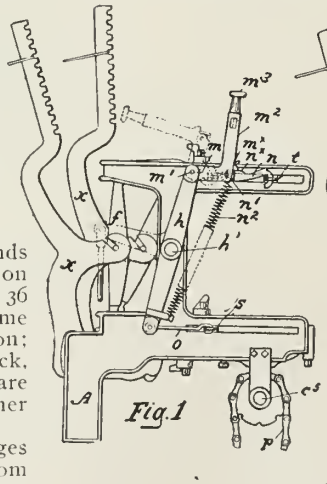


Fig. 1

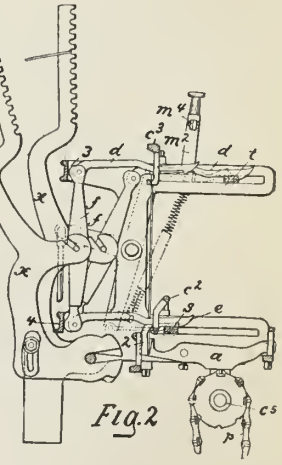


Fig. 2

The object of this device is to impart to the lifters or depressors or, as they are sometimes termed, "knives" of a dobby, a movement independent of the movement of the same by the usual harness shifting

devices for the purpose of changing the relative positions of said knives for leveling the harness, to enable the operator to more easily get at the loose or broken threads for adjustment or repair.

Fig. 1 is a side elevation of the new mechanism, Fig. 2 a vertical longitudinal section thereof, and Fig. 3 a detail showing the jointed connection as collapsed for evening.

A indicates the frame, $x$ the harness levers, $f$ the connectors, 3 and 4 stops, $t$ and $s$ lifters, $d$ and $e$ the hooked jacks jointed to the connectors $f$, $c^2$ $c^3$ the grids, $c^5$ the shaft, $p$ the pattern chain, and $a$ the levers provided at their front ends with toes 2.

One of the lifters—as for instance $s$—is connected by a link $o$ with an actuator $h$, shown as a lever fulcrumed upon a shaft $h'$, mounted in the frame and actuated by a rod. At its end opposite the link $o$ the said actuator $h$ is connected with the other lifter or blade $t$ through the medium of a jointed connection, consisting of the two members $m$, $n$, the former of which is jointed at $m'$ to the actuator $h$, the latter being hooked at its end to engage an eye in the extended end of the lifter, the said members $m$ and $n$ being jointed together at their adjacent ends, as indicated at $n'$.

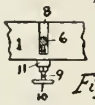


Fig. 2.

A spring $n^2$, connected with one of the members—as for instance the member $n$—and at its opposite end with a support, as the lower end of the actuator $h$, tends constantly to hold the two members in their horizontal extended positions, Fig. 1, said members being provided with stop surfaces $n^x$ and $m^x$ to limit the spring actuated movement of the members and give to the latter the firmness and rigidity which are necessary, when in the position shown, to enable the lifter to be reciprocated by the vibrations of the actuator $h$.

One of the members, as $m$, is provided with a vertically extended arm $m^2$, provided with a handle $m^3$, and which is connected by a cross bar $m^4$ with the vertical arm of the corresponding member of the jointed connection at the opposite side of the loom.

In the normal operation of the loom with the parts as in Fig. 1, the lifters will be vibrated and will engage the hooked jacks and vibrate the harness levers $x$ according as the pattern chain $p$ determines.

If it should be desired to stop the loom for access to and to mend a broken warp thread, the loom will be stopped in its position, substantially as shown in Fig. 1, with the upper lifter at or near its extreme outermost position. The operator, by means of the handle $m^3$, now throws the said handle over into its dotted position Fig. 1, thereby breaking the joint

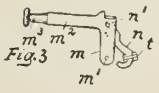


Fig. 3

and collapsing the connection, drawing the lifter $t$, movement of which is also assisted by the weight of the levers of the harnesses connected for the time being, thereto into its dotted position Fig. 1, nearly or quite over the lower lifter $s$, such movement of the lifter $t$ dropping the harness levers connected with it into the same plane as those controlled by the lower lifter.

This brings all the harnesses and their warps into substantially the same plane where they are easily accessible to the operator for repairing, etc. When the loom is started, the inward movement of the parts turns the lever $h$ on its pivot $h'$ from its full line position Fig 1, and since the lifter $t$ was already in its extreme position at the left, the movement of the upper end of the lever actuator $h$ away from it acts to automatically straighten the jointed or toggle connection again into its full line position Fig. 1, so that the next time the upper end of the lever moves to the right, it will push before it the lifter $t$, said jointed connection thereafter remaining in its extended and rigid position until again broken by the operator, as before described. *(Crompton and Knowles Loom Works.)*

## IMPROVED HARNESS LEVER FOR KNOWLES LOOMS.

The improvement relates to shedding mechanism for looms, the object being to provide an improved



Fig. 1

jack by means of which equal travel of each end of the harness frame will be obtained, and the top of the harness frame will always extend in a horizontal plane whether in its raised or lowered position.

In the ordinary construction of the shedding mechanism the harness levers or jacks have straight notched arms to which the connectors leading to the harness sheaves are attached. In the improved construction these arms of the jacks are curved instead of straight, and the series of notches in each arm extend in a curved line instead of a straight line.

Fig. 1 shows the upper portion or arches of a loom frame, partially broken away, with the improvements applied thereto, two harness levers or jacks and the upper part of two harness frames being shown; Fig. 2 is a detail showing the manner of adjusting the shaft which carries the sheaves. Fig. 3 shows, on an enlarged scale, one of the angular harness levers or jacks shown in Fig. 1 detached, with the lower notched arm complete.

1 are the arches, or upper portion of a loom frame, 2 are the angular harness levers, or jacks, centrally pivoted on a rod. The harness levers 2 have the upright arms with notched inner edges and the horizontal arms with notched inner edges, which are connected by cords to the harness frames 3, the upper portions only of which are shown in Fig. 1. The angular harness levers or jacks 2 have the end portions thereof, where the notches 2′ extend, curved

instead of straight, so that the inner ends of the series of notches 2′ in each arm of the lever 2 will lie in a curved line *x* between the two end notches instead of a straight line *y*, as shown in Fig. 3.

Two sets of sheaves 4 and 5 extend between the front and rear arch 1, and each set is mounted and turns loosely on a shaft 6, which extends at each end in a vertical groove or recess 8 in the inner side of the arch. (See Fig. 2.) An adjusting screw 9, provided with a hand wheel 10, turns in a boss 11 on the arch, and the upper end of said screw extends under and engages the end of the shaft 6.

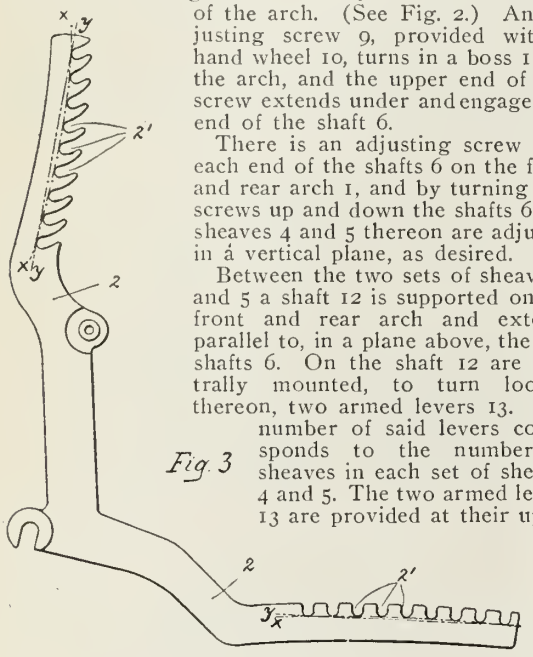



Fig. 3

There is an adjusting screw 9 at each end of the shafts 6 on the front and rear arch 1, and by turning said screws up and down the shafts 6 and sheaves 4 and 5 thereon are adjusted in a vertical plane, as desired.

Between the two sets of sheaves 4 and 5 a shaft 12 is supported on the front and rear arch and extends parallel to, in a plane above, the two shafts 6. On the shaft 12 are centrally mounted, to turn loosely thereon, two armed levers 13. The number of said levers corresponds to the number of sheaves in each set of sheaves 4 and 5. The two armed levers 13 are provided at their upper ends with two oppositely extending hooks or open end slots 13′, and at their lower ends in this instance with one hook or open end slot 13″.

The levers 13 intermediate their ends are provided with the circular or disk portion 13‴, which makes the lever stiffer and more rigid and furnishes a surface for two contiguous levers to slide on, as said levers are moved in opposite directions. The diameter of the circular portion 13‴ is a little greater than one-third and less than one-half the length of the lever 13; but the circular portion is small enough so as not to interfere with or come in contact with the connection attached to the lower end of said lever when the lower end is moved to the left, as shown in Fig. 1.

From each harness lever or jack 2 a connection 14 extends to the upper end 13′ of the lever 13. Said connection 14 is provided with a metal loop or link 15 at each end, which fits over the notched end of the harness lever and over the hook next to the harness lever on the lever 13. A second connection 16, provided with a loop or link 17 which fits over the other hook on the upper end of the lever 13, leads over the top and outer edge of a sheave of the outer set 5 and is connected at its other end to the top of a harness frame 3 near the end thereof. A third connection 18, provided with a loop or link 19 which fits over the hook on the lower end of the lever 13, leads over the top and outer edge of a sheave of the inner set of sheaves 4, and is connected at its other end to the top of a harness frame 3 near the end thereof.

The curvature of the notched edge of the upright arm of the harness levers 2, previously referred to, when the upright portions of said levers are in their central position—that is, midway between their right and left extreme position—corresponds to the arc of a circle, the center or axis of which is the point of connection between the connection 14 and the two armed lever 13 when the upper part of said lever is in its central position—that is, midway between the extreme right and left position shown in Fig. 1.

By making the notched edges of the harness levers 2 curved, as previously described, each notch in the upright arm of the lever (when the upright arm of the lever is in its central position) is at the same distance from the point of connection between the connection 14 and the two armed lever 13 (when said lever is in its central position) and the lower arm of the two armed lever 13 must move equal distances from a vertical line drawn through the pivot of said lever and so maintain equal angles of the connections from said lever relative to the sheaves and lift the harness frame the same distance at each end of the frame without regard to what notch 2′ in the upright arm of the lever 2 the link 15 on the connection 14 engages.

In the case of straight upright arms of harness levers the distance between the upper and lower notches and the point of connection of the connection 14 with the upper arm of the two armed lever 13 will vary and the angles formed by the connections with the sheaves will vary, so that the harnesses will not lift evenly unless the straps or connections 14 are of different lengths for the different notches.

By making the notched edges of the harness levers curved, it is not necessary to have connections 14 from the harness levers of different lengths for the different notches. The same connection may be used from the top notch as well as from the bottom notch or any intermediate notch, the distance from each to the point of connection of the connector 14 with the upper arm of the two armed lever being the same. *(Crompton and Knowles Loom Works.)*

## IMPROVEMENT TO THE KNOWLES SHEDDING MECHANISM.

In the new construction there are substituted for the two frames as previously used for supporting the two sets of two and three armed levers, a single frame made in one piece, and for said levers, segments of circles or sheaves having grooved edges to receive the connectors leading to the top of the harness frames and the transverse bars or sections of the frame which connect the side bars together are made in the shape of drip pans to catch any drippings of oil with which the parts of the shedding mechanism may be lubricated.

Fig. 1 shows the upper portion or arches of a loom frame and a sectional view of the improvements applied thereto, taken on line 1-1 Fig. 2, looking in the direction of arrow *b*, same figure. Two harness levers or jacks and the upper part of two harness frames are shown. Fig. 2 is a plan view of the central portion shown in Fig. 1, looking in the direction of arrow *a*, same figure. The connections to the harness levers are not shown. Fig. 3 is a side view of the frame detached, looking in the direction of arrow *b*, Fig. 2. The sheaves and their connections are not shown.

Between the loom arches 1 is supported the adjustable and removable frame 4, which carries the two sets of sheaves. The frame 4 consists of the two parallel side bars 5, each having two outwardly extending ears or flanges 6, which extend over the top of the arches 1, as shown in Fig. 2, and are provided

with adjusting screws 7 to level and adjust the frame 4. A lug or knob 8 extends out from each bar 5 and enters a vertical slot 8′ in the inner side of the loom arches to hold the frame in place, as shown in Fig. 2. A bolt 9 extends through a hole in the loom arch and through a vertical slot 9′ in each side bar 5 of the frame 4 to secure the frame to the loom arches and prevent its being tilted at the end.

The side bars 5 of the frame are connected at each end by the transverse bars or plates 10, which are made integral with the side bars 5, as shown in the drawings, and in the shape of and to form drip pans. Extending over each drip pan 10 and secured in the ends of the bars 5 of the frame 4 are two shafts 11 and 12. Upon said shafts are loosely mounted the segments of circles or sheaves 13 and 14. The shafts 11 and 12 do not lie in the same horizontal plane, but the shaft 12 is mounted in stands 12′ which extend above the side bars of the frame.

The sheaves 14 are formed with a hook 14′ at the upper end thereof, over which extends a link 15 which is connected by a wire 16 with a link 17, extending over the upright arm of the harness lever 2 and fitting into one of the notches therein. The sheaves 14 are also provided with a downwardly extending arm 14″ below its pivot point, and to said arm is pivotally attached one end of a bar 18. The other end of the bar 18 is pivotally attached to the sheave 13 above its axis, as shown in Fig. 1. Said bar 18 extends in a horizontal plane and parallel with the side bars 5 of the frame 4.

The outer edge of the sheaves 13 and 14 are grooved to receive the cord or connection 19 which is fastened

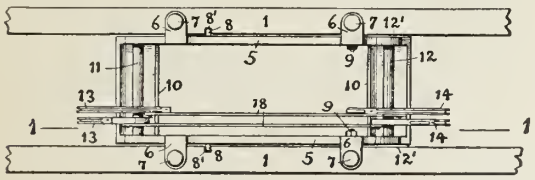


Fig. 2

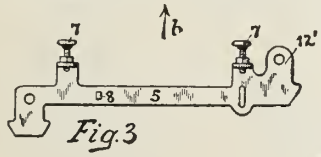


Fig. 3

at one end of the upper part of the sheave and at the other end to a link 20, connected by a screw 21 with the top bar of the harness frame 3.

The operation of the shedding mechanism is thus: As the harness levers 2 swing or move back and forth on their pivotal support, the harness frames through connections 16, sheaves 14 and 13, connector bar 18, and connections 20 to the harness frames, are by the construction and arrangement of the sheaves and connections, raised equally at each end. *(Crompton and Knowles Loom Works.)*

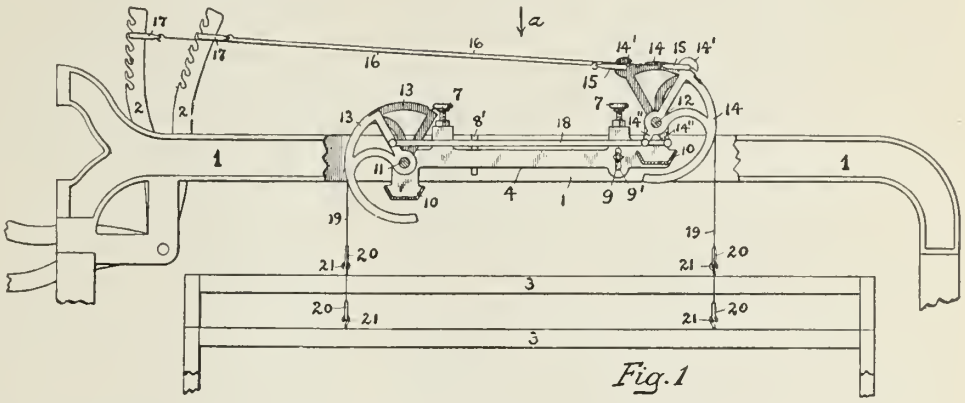
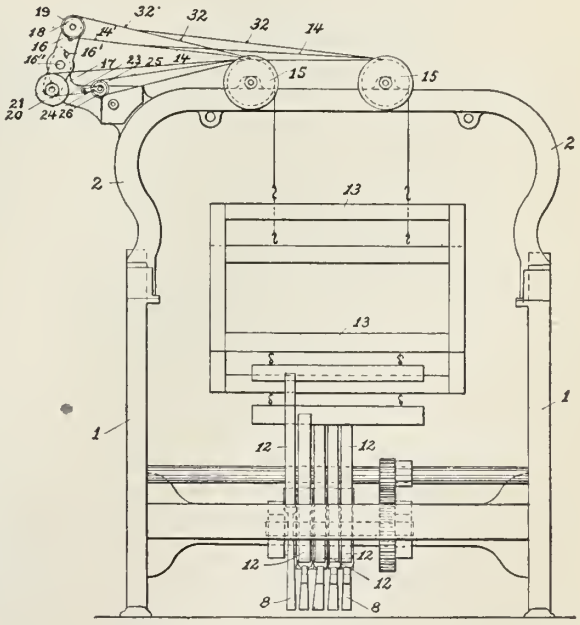


Fig. 1

## TOP RIGGING FOR CAM LOOMS.

The improvement relates to looms in which the harnesses are governed by a series of under cams which are operated from the picking shaft. The object is to simplify the top rigging and to place it to one side of the loom instead of directly over the harness, and thus remove any risk of oil from the journals falling upon the warp. The illustration represents the front view of a loom showing the harness frames,



the under cams and levers, in connection with the improved top rigging.

1 are the loom sides, 2 the top rail or arch, 13 are the harness frames, 12 are the straps connecting the harness frames with the treadles 8.

The top rigging mechanism consists in a main lever 16, centrally pivoted at 16″ upon a stand or bracket

17. This lever can be oscillated back and forth as desired by the harness, or it can be locked by means of a pin 16′. On the upper and lower end of lever 16 are loosely mounted two strap carriers in the form of rolls 18 and 19, and 20 and 21 respectively. Each pair of rolls may be attached together or made in one piece. To the roll 21 is attached one end of a strap 23 which has at its other end a loop 24, carrying two rolls 25 and 26 attached together and turning freely upon a pin. Upon each roll as 18 and 19, (also 20 and 21, 25 and 26) is attached on opposite sides a strap as 14′ and 32′, to the ends of which are attached two other straps as 14 and 32 which pass over the pulleys 15 and connect with the top part of the harness frames 13. Thus it will be seen that the harness frames connected with each pair of rolls must work in opposite direction, as for instance when the harness frame connected to strap 32′ is up the one connected to 14′ must be down, and *vice versa*.

The double roller arrangement 20 and 21, 25 and 26, on the lower end of lever 16 is for operating an odd number of harness as three or five, the arrangement alone operating three harness, and if used in connection with the top rolls 18 and 19, five harness.

As is shown in the illustration two harness can be operated alone from the rolls 18 and 19.

The rolls 20 and 21 may be locked to the lever 16 by means of a pin (not shown) and the rolls 25 and 26 used to operate two harness, or in connection with rolls 18 and 19 four harness.

Thus the rigging shown in illustration can be used for either two, three, four or five harness as the case may require. *(Crompton and Knowles Loom Works, Worcester, Mass.)*

## CROMPTON & KNOWLES LENO MOTION.

In looms for cross or leno weaving the warp threads are usually divided, the standard warp being drawn from one beam, the whip threads from a second beam. The whip threads after leaving the beam are passed over a "slackner."

The object of the new device is to provide improved means for vibrating the slackner and holding the same in position under the tension of the warp threads drawn thereover.

In the new mechanism we find the auxiliary harness moving mechanism connected with any harness frame to be moved thereby in a manner which will enable said frame to be moved by said auxiliary mechanism without moving the harness lever for that frame, at the same time permitting such harness frame to be moved by its harness lever without moving the auxiliary mechanism.

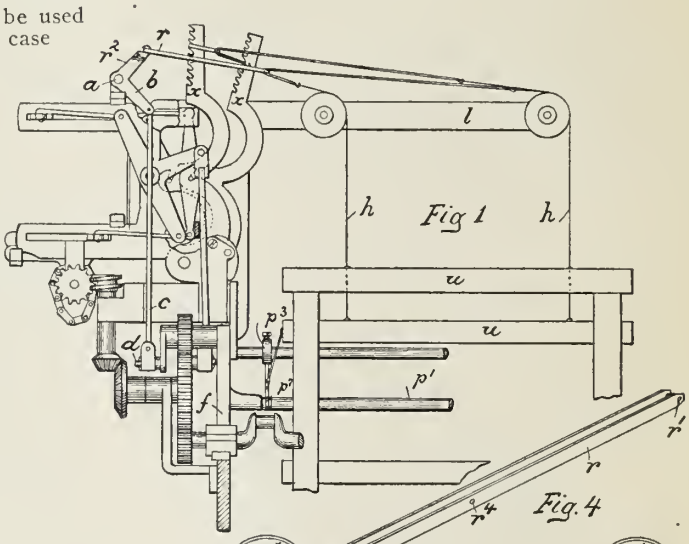
Fig. 1 in front elevation, shows a sufficient portion of a loom and the new mechanism so that the construction and operation of the latter is readily understood. Figs. 2 and 3 are cross sectional diagrams showing the parts in different positions and Fig. 4 is a detail perspective of the connecting means between the harness lever, the auxiliary harness moving mehanism, and the harness frame.

*l* indicates the arch of the loom frame, *x* the harness levers, *h* the harness straps, *u* the harness frames, *a* the rock shaft, *b* its lever, *c* the actuating connection as connected with crank *d*.

The warp threads are shown as divided into groups *w w′*, the threads *w* being drawn from beam $w^x$, shown as mounted in an elevated position on the loom frame, the threads *w′* being shown as drawn from a separate beam $w'^x$, mounted also in the loom frame, but beneath the beam $w^x$. One set of threads, as *w′* (standard threads) are drawn over the whip roll *p*, whereas the whip threads *w*, which are the threads to be crossed, are drawn from the beam $w^x$ down and about the slackner *p′* which is made to vibrate by mounting the same in the free ends of the depending arms $p^2$, fast on the shaft $p^3$ as journaled in the loom frame, and to the lower end of which is jointed at $p^5$, one end of a toggle lever $p^4$ jointed at $p^x$ to its co-operating toggle lever $p^6$, the latter at its opposite end being jointed at $p^7$ to a fixed support, as the frame *f*.

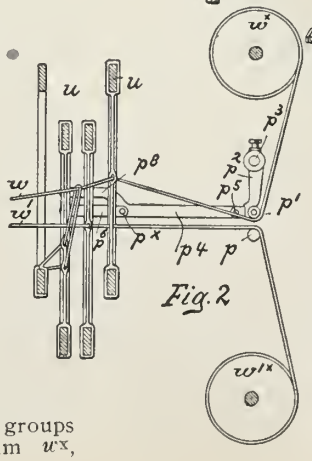
The lever $p^4$ is provided with an arm $p^8$, which extends beyond the joint $p^x$ and is connected by a link $p^9$ with that one of the harness frames *u* which governs or co-operates in governing the crossing of the thread *w′*, thereby constituting one form of means connected with a moving part of the loom for vibrating the slackner *p′* through the medium of the toggle lever described.

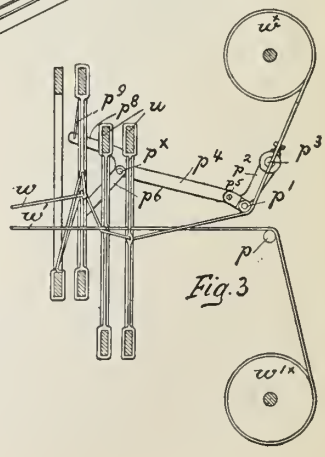
When the harness frame to which the link $p^9$ is connected is raised, it will operate to buckle the toggle levers as shown in Fig. 3, to thereby draw the slackner *p′* toward the harness to give out sufficient lengths of threads *w* to enable the same to be properly









crossed, as shown in said figure. When the said harness frame is dropped to its position Fig. 2, the toggle levers are restored to their normal position, as there shown, said levers then holding said slackner in fixed position.

An advantage for the new mechanism consists in that when the levers $p^4$ and $p^6$ are in their normal position Fig. 2, they lie in a direct line between the slackner $p'$ and the fixed point $p^7$ on the frame, so that the tension of the threads $w$, tending at such times to draw the slackner toward the harnesses, is received directly by the said pin and the frame or support and not by the harness frame or part to which it is connected and by which it is operated.

The connections $h$, for that harness frame which is to be moved by the auxiliary mechanism instead of being connected directly with and to be moved by the harness lever for that frame are connected by a pin $r'$, with one end of a link like connection $r$ connected with an arm $r^2$ fast on the rock shaft $a$ of the auxiliary harness moving mechanism, said link being connected with said arm by a pin $r^3$. (See Fig. 4.) Intermediate its length, however, and in position close to and at the left of the said harness lever Fig. 1, the link $r$ is provided with another pin $r^4$, so that whenever the harness lever passing through the link is vibrated it will engage the pin $r^4$ and, through the latter and the link, raise and lower the harness frame connected with said link, the latter at such times sliding freely past and without moving the arm $r^2$ of the auxiliary mechanism. When, however, it is desired to move said harness frame by the arm $r^2$ of the auxiliary mechanism, as for a half and return movement characteristic of leno weaving, said link slides freely past and without moving the harness lever protruding therethrough. The pins $r^3$ $r^4$, constitute independent connections between the auxiliary harness moving mechanism and frame, and the harness lever and frame enable the latter to be moved by either said auxiliary mechanism or lever independently and without moving the other. *(Crompton and Knowles Loom Works.)*

## STAFFORD'S INDICATING DEVICE FOR DOBBIES.

The object of the improvement is such a construction of the indicating device of a dobby as to permit the successful use of wooden pegs.

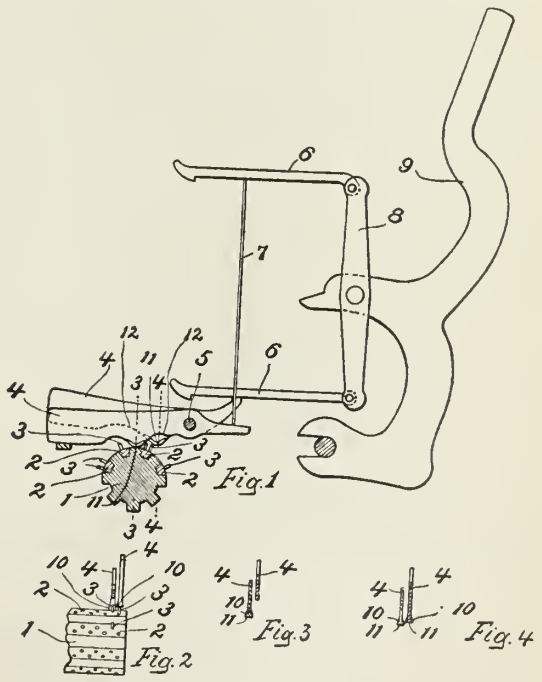
The improvement is shown in the accompanying illustrations of which Fig. 1 is a view representing in vertical section a pattern barrel as well as part of a pattern chain, also representing in side elevation a pair of indicator fingers, the needle and hooks which are controlled in position by the said indicator fingers, the jack to which said hooks are pivoted, and the harness lever with which said jack is connected. Fig. 2 is a view of the pattern cylinder, pattern chain bars, and indicator fingers in elevation looking from the right hand side in Fig. 1. Figs. 3 and 4 are views in vertical section on the dotted lines 3-3 and 4-4, respectively, in Fig. 1.

1 indicates the pattern barrel, 2 the pattern chain, 3 the pegs and 4 the indicator fingers as acted upon by the pegs 3.

The indicator fingers 4 are mounted on a rod 5, and control the position of the hooks 6. In Fig. 1 one of the said hooks is shown resting on the inner end of one of said indicator fingers 4. A vertical needle 7 is shown supported by the inner end of the other finger and the other hook rests on the upper end of the said needle. 8 is the jack having the said hooks pivoted to its opposite ends, and 9 is the harness operating lever to which the jack is connected.

Customarily the surface on the lower edge of each of the indicator fingers with which the pegs 3 engage is grooved to receive the ends of the said pegs, the indicator fingers and the parts which are operated in connection therewith being made as thin as consistent with proper strength and are brought as closely together as possible in order to reduce the necessary length of the bars of the pattern chain to the minimum.

Sometimes in order to reduce the number of bars two rows of indicator pegs (answering two successive sheds) are applied to each bar of the pattern chain, as shown in the illustrations. The indicator pegs upon the bars, both when a single row of pegs is used thereon (single index) and a double row (double index) is used, are spaced closely to agree with the spacing of the indicator fingers. These features of construction give rise to the following disadvantages. The indicator fingers as hung on the rod 5 somewhat loosely are in consequence liable to become shifted slightly to one side or the other of the center lines of the pegs which are intended to act upon the same. Hence in consequence of the close compactness or crowding of the parts, it happens occasionally that a pointed, inclined, or crooked peg on coming into place adjacent to the indicator fingers will pass to one side or the other of the indicator finger or lever which should be moved thereby. This quite frequently is the case at present, and the result is a mispick in the




cloth being woven. With the ordinary construction of indicator fingers, also, it frequently happens that a little defect in the chain or the fingers—for example, an inclined or crooked peg or a slight displacement of the fingers—will cause two fingers to be indicated by a single peg when but one thereof should be indicated, which of course occasions an imperfection in the cloth. For the sake of lightness it frequently is the case that pegs made of wood are employed. Wooden pegs wear out rapidly in consequence of

their contact with the narrow grooved edges of the indicator fingers and it frequently is found difficult to weave satisfactorily on a double index dobby having indicator fingers of ordinary form and construction, for the ends of the wooden pegs which come in contact with the fingers fray out and spread so as to engage with or indicate two adjoining fingers when one of them alone should be indicated.

The object of the new mechanism is to provide an improved construction of indicator fingers free from the foregoing disadvantages. This new construction is clearly shown in the illustrations, showing the projecting portions on the under edges of the indicator fingers and with which the indicator pegs engage, instead of being located at the same point in the length of each of the two indicator fingers which are concerned in controlling the operation of a given harness lever, so that the projections on the pair of fingers come side by side, which is customary in practice, are, on the contrary, located at different places in the lengths of the respective indicator fingers, so that the projection of one finger is located in advance of the similar projection on the other finger of the same pair.

This obviates the likelihood of mispicks resulting from two indicator fingers being raised by the action of a single peg on the pattern chain. Moreover, the lower portion of each of the said projections is broadened, as at 10, so as to present a flat surface 11 to the action of the pegs which is considerably broader than the acting edges of the indicator fingers have heretofore been made. The advantages gained by thus broadening the acting edges of the indicator fingers are very great. It enables a broader peg to be used on the pattern chain, which saves wear upon the indicator finger and also upon the peg, thus facilitating the use of wooden pegs, as well as obviating mispicks in consequence of the peg passing to one side of a finger which has worked a little to one side. Heretofore the construction of the indicator fingers has not permitted of this broadening of the edges of the projections; but by locating the projection on one finger somewhat in advance of the other finger of such pair and in addition cutting away the material of each finger or lever adjacent its projection, as at 12, no difficulty is experienced in giving sufficient breadth to the acting portion of each of the projections and in providing free clearance for the widened portions in the movements of the indicator fingers, while the said fingers are permitted to lie as close together side by side as heretofore. (*Crompton and Knowles Loom Works.*)

## THE CROMPTON TWO WEAVE SHEDDING MECHANISM FOR DOBBY COTTON LOOMS.

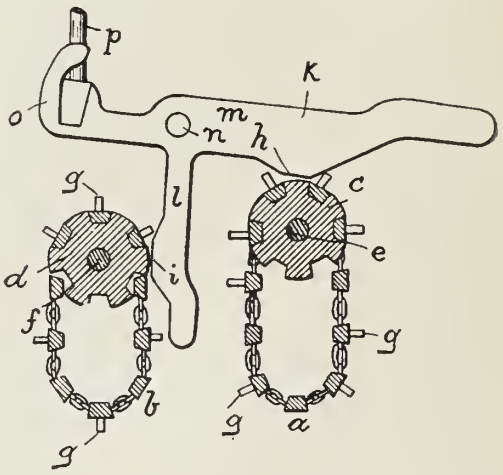
The mechanism has for its object the weaving of fabrics employing a plurality of pattern surfaces in the form of chains adapted to be operated successively —for example, one during the weaving of a border or end and the other during the weaving of a plain portion or body of a fabric.

The gist of the new mechanism is to simplify and improve pattern mechanisms of the class referred to, whereby the change from one pattern to another and the operation of the loom is facilitated.

The illustration is a diagrammatical section of the pattern surface relatively to the parts moved thereby, its peculiar construction being the means of permitting a quick exchange from one weave to the other weave.

Examining illustration we find the pattern surfaces, shown as two in number and indicated by *a* and *b* being chains mounted upon cylinders *c* and *d* fixed upon shafts *e* and *f*, journaled in bearings in or carried by the dobby frames. Loose upon the shafts *e f*, respectively, are fixed the worm wheels driven continuously by a worm arranged between them, said worm being driven from some working part of the loom.

The pattern surfaces *a* and *b* are formed (according to the weaves required) with pins or projections *g*, which are adapted to co-operate with and effect the operative movement, rise and fall, of the selecting surfaces *h i* on the arms *k* and *l* of the selecting fingers *m* fulcrumed at *n* and constructed in a manner to cause the shifting of the hooks of the dobby, said fingers being provided at their inner ends with the horns *o* and pockets for the reception of the rods *p*.




The arms *k* and *l* stand at right angles with each other, so that one is acted upon by and at the top of its pattern cylinder and the other by and at the side of its pattern cylinder, the latter for this purpose being arranged at a lower level than the former.

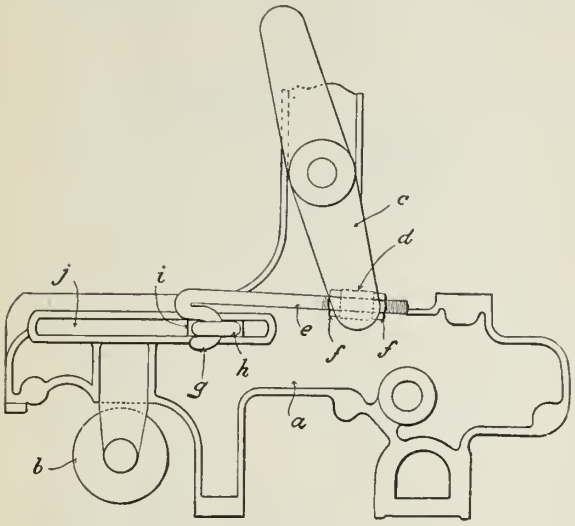
The surfaces *a b* when operated move continuously, and the clutch devices and their actuating mechanisms are so adjusted that the pattern surfaces are always stopped in a position, as shown in the illustration, with the selecting surfaces *h i* standing in position opposite the space between two adjacent or successive projections of their pattern surfaces. In other words, any projection lifting its selecting surface is permitted to pass that surface before the chain carrying that projection is stopped, and by so doing said chain is always left in readiness to immediately engage and move its selecting surface when again set in motion.

By thus stopping each pattern surface with its co-operating selecting surface in position between two of the pattern surface projections said pattern surface is always in readiness to move said selecting surface on initial movement of the pattern surface, enabling the change from one pattern to the other to be effected more quickly than is possible with mechanisms of this class as heretofore constructed. (*Crompton and Knowles Loom Works.*)

## STAFFORD'S IMPROVEMENT TO DOBBIES.

The new construction refers to the hooked rods or links which connect the ends of each knife or lifter in a dobby with the corresponding arms of the

actuating rockers, in turn providing a rod or link having a form of hook which will be free from tendency to slip out of position and to occasion breakage of either the hook or the eye, as in the case of the old form of construction.




The accompanying illustration shows in side elevation a portion (as much as is necessary to explain the improvement) of a dobby having the new device applied thereto.

*a* designates a portion of the dobby frame, and *b* the pattern cylinder. The rocker at one side of the dobby is shown at *c*, the swivel applied to the lower arm of the said rocker being shown at *d*. *e* is a hooked rod or link it having its stem passed through the said swivel and adjustably secured relatively thereto by means of the nuts *f* upon the screw threaded portion of the said stem at opposite sides of the swivel. *g* is the hooked end of the rod or link *e*. *h* is the eye, in which the said hooked end of the rod or link *e* engages, and *i* is one of the knives or lifters, it being provided at the end thereof with the said eye *h*. The slot or guideway in which the end of knife or lifter *i* moves is designated *j*. The characteristic of the improved hook *g* is the fact that it is recurved or reversed, whereby the convex side thereof is presented toward the rocker *c*, so that in the movement which carries the knife or lifter *i* outwardly (it is in the outward movement of the knife or lifter that the latter does its main work —*i. e.*, engages with the selected jack hooks and carries them outward for the purpose of operating the corresponding harness levers and raising the required harness frames) the push is transmitted by the concave side of the hook *g* to the eye *h*.

The form of hook *g* is such that it fits securely in place in eye *h* and merely rocks slightly in the said eye in consequence of the curvilinear path of the point of connection of the hooked rod or link *e* with the rocker and cannot by any possibility, in consequence of any amount of wear, work out of place, so as to occasion breakage. *(Crompton and Knowles Loom Works.)*

## INGRAHAM'S SHEDDING MECHANISM.

The object of this mechanism is to provide means whereby each pattern lever is caused to control both the upper and lower jacks of a pair, said jacks having a stop for limiting their movement. The driving mechanism for the pattern chain drum is self releasing when meeting with any obstruction, and the construction of the compensating spring under motion whereby the heddles are drawn downward is improved.

Fig. 1 is a front view, partly in section, of sufficient of a loom to illustrate this shedding mechanism. Fig. 2 is a view, on an enlarged scale compared to Fig. 1, of the driving mechanism for the shaft of the pattern chain drum; and Fig. 3 is a plan or top view of the same, partly in section.

1 indicates the frame having in the upper portion a shaft 2, to which are hung the harness levers 3, the upper ends of which are notched for the reception of cords 4, which pass over pulleys 5 and are connected to the harnesses 6. Hung to each of the harness levers 3 is a lever 7, which is pivoted about midway of its length and carries both at its upper and lower end a hooked jack 8, the upper jacks being actuated by a sliding bar 9 and the lower jacks by a similar bar 10, reciprocating motion being imparted to these bars by any form of mechanism, so that the

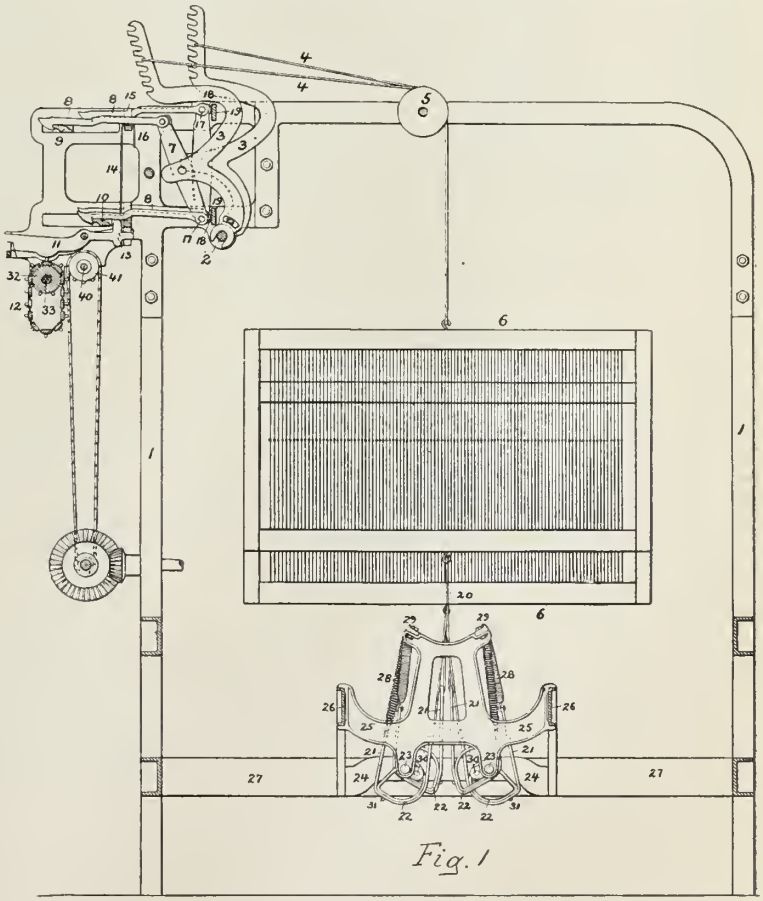



Fig. 1

upper bar moves inward as the lower bar moves outward, and vice versa. Each of the lower jacks 8 is under the direct control of a lever 11, actuated by the pins of a pattern chain 12, so that the hooked end of said lower jack may be raised out of range of the bar 10 or dropped into range of the same.

From the side of each of the levers 11 projects a pin 13, around which is bent the lower end of a wire 14, which projects upward to the grid 15, which guides the upper jacks 8, the upper end of each wire 14 being bent so as to form a double yoke 16, occupying the slot of the grid beneath its respective jack 8, the two runs of wire in the yoke lying side by side, so as to provide for the proper support of said jack. The operation of either of the pattern levers 11 will thus effect the simultaneous lift or drop of both upper and lower jacks of the corresponding jack lever 7; each of which has at each end a projecting pin 17, adapted for the reception of the eye at the inner end of the jack lever 8, and on each end of the lever is a projecting segmental web or rib 18, which by contact with a fixed bar or brace 19 on the loom frame serves to arrest the movement of the end of the lever and provides a proper fulcrum bearing for the same when its other end is moved under the action of one of the reciprocating bars 9 or 10.

The lower end of each of the harnesses is connected by a cord 20 to a strap 21, which is secured to a lever 22 by a pin 31; said lever being hung to a rod 23, mounted in frames 24 and 25, which are secured to beams 26, carried by transverse beams 27 of the loom frame. There are two rods 23 and two sets of levers 22, and the strap 21 of each lever is connected at one end to the cord 20 and at the other end to a spring 28, which is secured at its upper end to bar 29, carried by the frames 24 and 25.

Each of the levers 22 has a curved face, eccentric in respect to the axis of the fulcrum rod 23. Hence in the operation of the device the pull of the springs upon the harnesses is graduated to accord with the strain upon the warp, so that the strain upon the harness levers by means of this under motion is equalized.

A bar 30 passes through each series of the levers 22 and serves by contact with the upper portion of each lever to limit the outward swing of the same, and thus govern the extent of depression of the harnesses. The best leverages are obtained when each lever 22 has its face partly eccentric and partly flat, as shown, the spring end of the strap leading from the flat face.

The pattern chain drum 32 is secured to a shaft 33, to which is also secured a disk 34, see Fig. 2, having a series of recesses uniformly spaced around its periphery, the hub of said disk also having another disk 35 with peripheral recesses adapted for the reception of a retaining roller 36, which is carried by a lever 37, acted upon by a spring 38, and hung to a shaft 40 adjacent to and parallel with the shaft 33.

Secured to the shaft 40 is a sprocket wheel 41, which is driven by a chain, as shown in Fig. 1, and to said shaft 40 is also secured a hub 42, with notches adapted for the reception of bevel lugs 43, Fig. 3, upon the inner face of a disk 44, which is loosely mounted on the shaft 40 and has on its inner face a series of projecting pins 45, adapted as the disk 44 is rotated to engage successively with successive recesses of the disk 34, so as to impart intermittent movements of partial rotation to the latter. As shown in Fig. 2, there are four of these pins 45 on the disk 44, hence there will be four movements of the disk 34 and consequently of the pattern chain drum and its chain for each rotation of the shaft 40.

The beveled lugs 43 of the disk 44 and the corresponding beveled recesses of the hub 42 are normally kept in engagement by the action upon the disk 44 of a spring 46, interposed between said disk and a collar 47 at the end of the shaft 40, and in the event of any undue obstruction to the movement of the

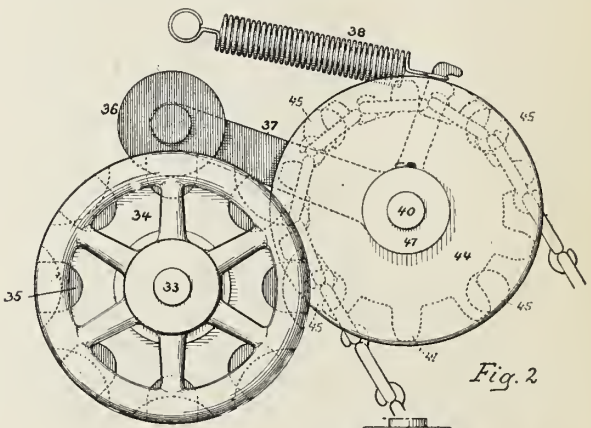


Fig. 2

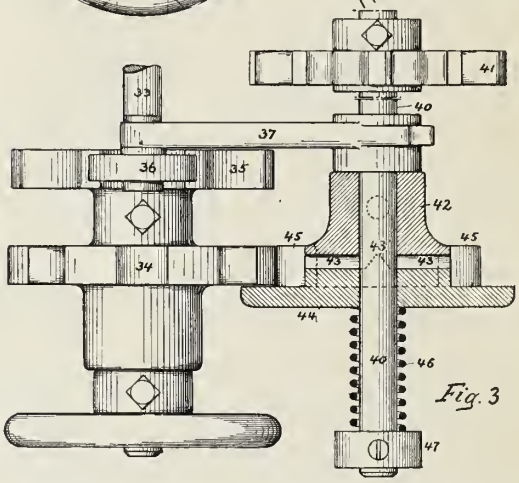


Fig. 3

pattern chain, the wedge like action of the walls of the recesses of the hub 42 upon the lugs of the disk 44 will cause the latter to be forced outward, so as to free it from the control of the hub. Hence there will be no operation of the pattern chain until the obtruction to its movement has been removed. *(Fairmount Machine Co., Phila.)*

## DRAPER'S SELVAGE MOTION FOR COTTON LOOMS.

The object of this motion is to prevent any undue strain on the selvage threads; the threads of the selvage being woven in a different manner from those in the body of the cloth.

Heretofore in selvage motions for the class of looms to which the improvement refers, the selvage sheds are left open while the lay beats up the filling, thereby causing considerable unnecessary strain on the selvage threads.

In the new device the selvage motion is so constructed and arranged that the selvage sheds are nearly closed while the lay beats up, thus obviating any undue strain on the selvage threads and producing a better and more uniform finished fabric.

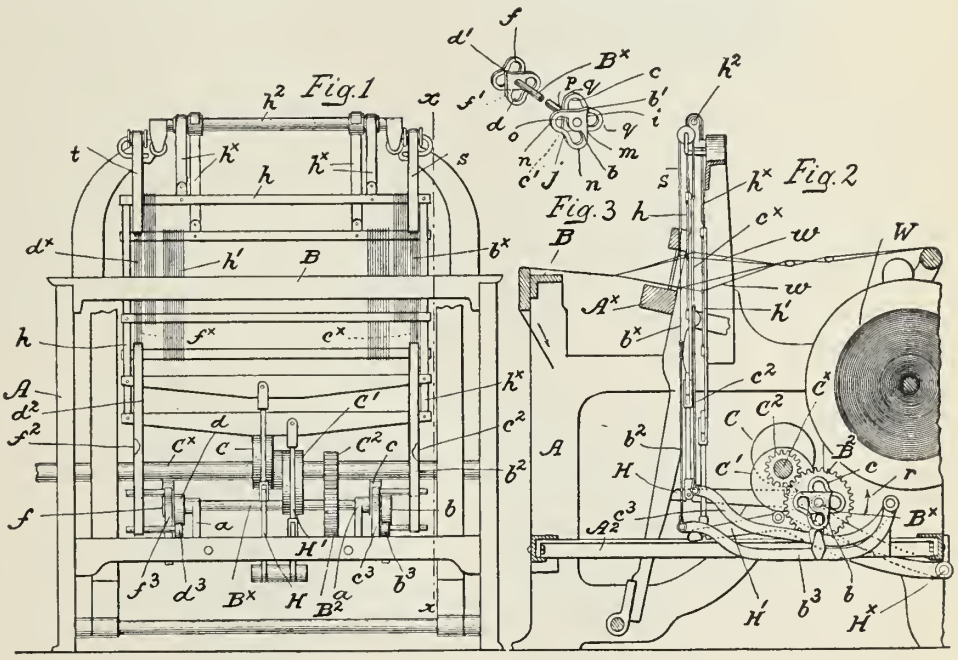
Fig. 1 is a front elevation of a sufficient portion of a loom to be understood with the novel selvage motion applied thereto, the lay being omitted. Fig. 2

is a vertical view thereof, taken on the line $x$—$x$, Fig. 1, looking toward the left. Fig. 3 is a perspective view, partially broken out, of the selvage cam shaft and cams thereon, showing the relative position of the cams. Fig. 4 is a plan of the weave for selvage shown in connection with part of the fabric.

A indicates the loom frame, B the breast beam, $A^x$ the lay, $C^x$ the main harness cam shaft, $h$ $h'$ the main harnesses by which the shedding of the warps $w$ is effected for body portion of the cloth; W indicates the warp beam.

The body of the cloth is shown for simplicity as woven by a two harness motion, the harness frames $h$ $h'$ being connected by flexible connections $h^x$, attached to the rotable shaft $h^2$, the foot of the frame $h$ being connected with a lever H, provided with a roll engaged and depressed by a cam C on the shaft $C^x$, a second cam C′ thereon acting on a roll carried by and to depress a lever H′ connected with the foot of the harness frame $h'$, said levers being fulcrumed at $H^x$.

Cross girths $A^2$ Fig. 2, are provided with stands $a$, forming bearings (see Fig. 1) for a selvage cam shaft $B^x$, having fast thereon a gear $B^2$, in mesh with a smaller gear $C^2$ on the main cam shaft $C^x$, the relative number of teeth in the two gears being such that the gear $C^2$ makes two complete revolutions for one revolution of the gear $B^2$, the latter gear and its shaft $B^x$ being rotated in the direction of arrow $r$, Fig. 2.




Upon the cam shaft $B^x$ four like cams are arranged in pairs $b$ $c$ and $d$ $f$, as best shown in Fig. 3, the cams being heart shaped, the points $b'$ $d'$ of the cams $b$ $d$ being diametrically opposite the centers of cams $c$ $f$, respectively, and *vice versa*, and viewing Fig. 3 the cams are set quartering upon the shaft with the points $b'$ $d'$ ninety degrees apart, the same angle separating the points $c'$ and $f'$.

Each selvage has its own harness frames $b^x$ and $c^x$ at the right hand side of the loom, $d^x$ $f^x$ at the left hand side, the former pair being connected by straps $b^2$ $c^2$, respectively, with treadles $b^3$ $c^3$, provided with rolls which are engaged and controlled by the cams $b$ and $c$, respectively, the frames having an overhead connection $s$. At the other side of the loom the cams $d$ $f$ act, respectively, upon the treadles $d^3$ $f^3$, connected by straps $d^2$ $f^2$ with the corresponding selvage harnesses $d^x$ $f^x$ the latter having a flexible overhead connection $t$.

In Fig. 2 only the right hand selvage shedding mechanism is shown to avoid confusion; but it will be seen from Figs. 1 and 2 that the main shed and both the selvage sheds are open preparatory to the passage of the shuttle therethrough, and viewing Fig. 2 the front selvage harnesses are shown in front of the plane of the main harness frame $h$, while the rear selvage harnesses are back of the plane of the frame $h$ and in front of that of the back plane $h'$.

By reference to Fig. 4 it will be seen that the selvage motion gives a different weave to the selvage from that in the body of the cloth, the filling being shown in the selvage as crossing the warp in pairs—that is, for two picks the filling will be above, and for the next two picks below a given warp thread, while in the body of the cloth it is one up and one down. When the selvage warps are crossed, the filling is carried around the endmost warp, as at $v$, to thus give the finished edge to the cloth, the carrying around of the filling alternating at opposite edges.

The working of the new motion is such that one set of selvage warps cross each other when the other set nearly approach each other, and *vice versa*, and during a complete cycle—that is, one revolution of the selvage cam shaft $B^x$—each set of selvage warps cross twice. The approach of the selvage warps to each other, whether followed by crossing or separation, takes place as the lay beats up the filling, and thus the selvage warps are relieved of any unnecessary strain due to beating up, so that the selvage warps are strained but little, if any, more than the main warps.

This produces a stronger and much more uniform web of cloth, free from wrinkles and stretched places in the selvage. The two pairs of selvage cams are positioned alike, each relative to its fellow, and all of the cams have the same shape and dimensions. Consequently a detailed description of one will suffice for all. The parts $i$ of cam $b$ are nearest the center of the shaft, the point $b'$ somewhat more distant and equally so with the portion $j$, and $m$ is set farther from the center, while the lobes $n$ are the farthest from the center. Now regarding cams $b$ and $c$, in the position shown in Figs. 1, 2 and 3, the treadle rolls are engaged by lobe $n$ and part $o$, separating the treadles the maximum distance and opening wide the shed of the selvage warps. In the next position the rolls are engaged by parts $j$ and $c'$, acting to nearly

close the shed, while the next following position restores the treadles to the starting position, the rolls engaging lobe *n* and opening wide the shed. Now the rolls engage the immediate adjacent parts *m* and *p* and they being equidistant from the center of the shaft $B^x$ the shed is completely closed. Further rotation brings the rolls into engagement with parts *q* and *i*, so that the shed is opened wide; but this time

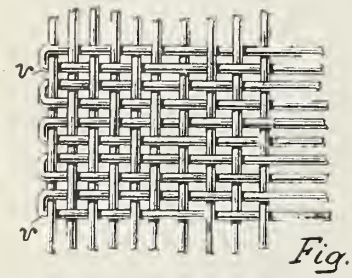


Fig. 4

the action is just the reverse of the prior one, and the warps are crossed, those formerly in the lower plane being brought into the upper plane of the shed, and *vice versa*. Then the warps are moved by the cams to nearly close the shed, next to open it wide, and thereafter to completely close the shed. The next movement of the cams operate to again cross the warps and open the shed, being the same position as mentioned first, since the movement of rotation of the cams has been divided into eight equal parts in order to make the same clear. *(Draper Co.)*

## NORTHROP'S SHEDDING MECHANISM FOR COTTON LOOMS.

The main objects of the new mechanism are the simplification and improvement of the shedding mechanism whereby the overhead arch of the loom frame and the overhead connections between the harness frames are completely obviated.

Fig. 1 is a front elevation of a portion of a loom (as much as is necessary to explain the construction and working of the new mechanism), at the left hand side thereof, showing the improvement; and Fig. 2 is a vertical sectional view thereof on the line *x-x*, Fig. 1, looking toward the left.

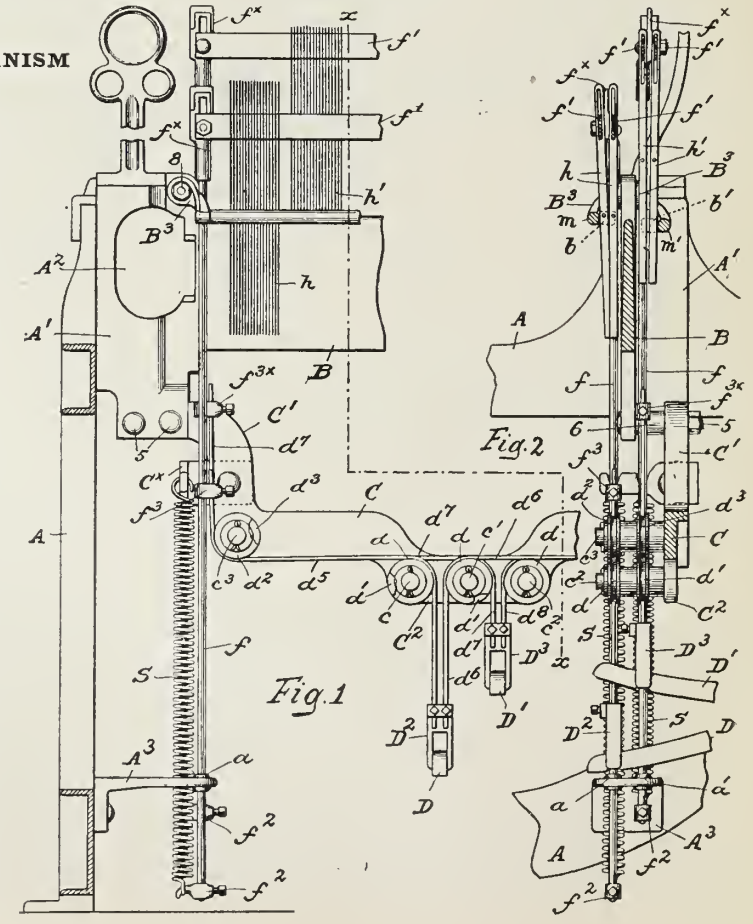
The loom sides, one of which is shown at A, have each an attached casting A′, with an opening $A^2$, through which the crank arms are extended, the upper ends of said castings being connected by an integral upright web B, extended across the loom and forming a separator for the lower ends of the series of heddles *h h′*. A cross girth or bar C is up turned, outwardly extended at its end, as at C′, and depressed at its central portion, as at $C^2$, the said ends being rigidly secured by bolts 5 to the lower ends of the castings A′, sleeves 6 on the bolts (see Fig. 2) being interposed between the bar and the rear side of the castings to support the bar in the proper vertical plane. Three studs *c c′* $c^2$ project from the front of the depressed portion $C^2$ of the cross girth or bar, on each of which is mounted two like sheaves *d d′*, having elongated hubs, said sheaves being made of wood impregnated with an antifriction compound, so that the sheaves will turn on the studs with a minimum of friction and without necessitating the use of oil or other lubricating material.

Near the outer ends of the bar, studs $c^3$ are made, each having two sheaves $d^2$ $d^3$ thereon of the described construction, the sheaves *d* and $d^2$ being in one vertical plane, with the sheaves *d′* and $d^3$ in a second parallel plane back of it.

A stand $A^3$ extends inward from each loom side, near its lower end, with two vertical bearings *a* and *a′*, while a double stand $B^3$, bolted at 8 to the upper end of each casting A′, extends inward at each side of the separator B and presents two vertical bearings *b* and *b′*, located vertically above the bearings *a* and *a′*, respectively.

Two harness frames are shown in the illustrations, each being composed of two upright side rods *f*, adapted to slide vertically in the bearings provided by the stands $A^3$ $B^3$, the rods having at their upper ends caps $f^x$, to which are bolted flat cross bars *f′*, set on edge and connecting the two side bars of each frame.

Each harness frame has two adjacent and parallel cross bars, as shown in Fig. 2, to support two series of heddles, which also serve as detectors, the upper ends of the heddles being longitudinally slotted, as shown in Fig. 2, to receive the cross bars and permit a limited relative vertical movement of the heddles. A collar $f^2$ is adjustably attached to the lower end of each front side bar *f*, to which is connected one end of a strong lifting spring S, the upper ends of the



pair of springs at each side of the loom being attached to a bracket $C^x$ bolted to the cross girth C, the springs tending to lift the harness frames.

Treadles D and D′ are pivoted at the back of the loom frame, and are depressed by cams, (not shown) the treadles being connected at their outer ends with the harness frames to depress them against the action of the springs. A stirrup $D^2$ is engaged by the treadle D, and a flexible connection $d^5$ is attached to the stirrup, passed up over the left hand sheave $d$ Fig. 1, under the sheave $d^2$, and up to an adjustable collar $f^3$ on the left hand side rod of the front harness frame. A second strap $d^6$, attached to the right hand side rod of said frame, passes down under the right hand sheave $d^2$, over the right hand and central sheaves $d$ Fig. 1, and down to the stirrup $D^2$, so that depression of the treadle D depresses the front harness frame, as shown. The treadle D′ engages a similar stirrup $D^3$, and one strap $d^7$ passes up over the back sheaves $d'$ and under the left hand sheave $d^3$ up to a collar $f^{3x}$ on the adjacent side rod of the back harness frame. The second strap $d^8$ passes up over the right hand sheave $d'$ thence under right hand sheave $d^3$, (not shown) and up a collar to the adjacent side rod of the back harness frame, the said frame being flexibly connected by the straps $d^7$ and $d^8$ to the treadle D′.

By means of the springs S and the connections between the harness frames and the treadles D D′, the said frames are reciprocated to form the sheds, the entire mechanism for reciprocating the frames being located at the lower part of the loom, and each frame is independently operated.

Rods $m$ and $m'$ are supported by the stands $B^3$ and extend across the loom at the front and back of the two sets of heddles $h$ and $h'$, respectively to serve as supports for the warps in the lower plane of the shed.

By means of the central group of sheaves on the cross girth C the flexible connections lead vertically to the treadles, and the depressed portion $C^2$, of the cross girth brings the tops of said sheaves tangent to the horizontal plane, which is tangent to the bottom of the sheaves $d^2$ $d^3$ at the ends of the girth. *(Draper Co.)*

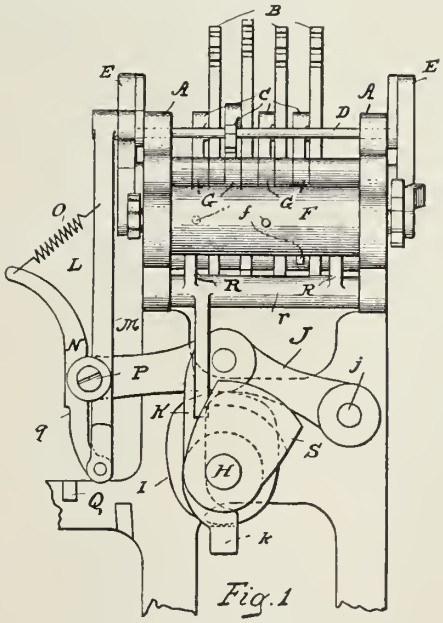


Fig. 1

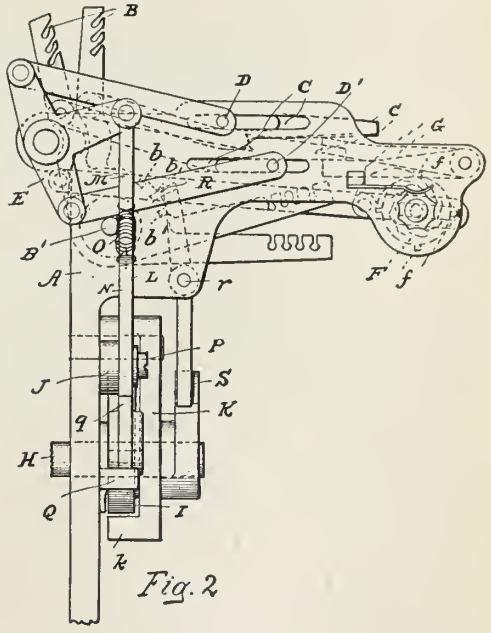


Fig. 2

## GOODYEAR'S SHEDDING MOTION.

On page 26 of Part I a description of the construction of this shedding mechanism is given; the present improvement relates to the construction of the actuating mechanism for the harness levers.

The operating connections between the main shaft and the harness levers are so constructed that under normal conditions the harness levers are positively actuated, but under abnormal conditions, such as an obstruction in the mechanism which would prevent the harness levers from being drawn forward by the usual reciprocating knives, the said operating connections yield to the extent necessary to prevent the reciprocating knives from being moved forward beyond the safe limit of movement of the harness levers.

Again the said operating connections are prevented from yielding in case of an excessive strain under otherwise normal conditions upon the connections between the harness levers and heddle frames, due to heavy warp or the like, which would otherwise prevent the harness levers from being thrown to the full extent of their movement. In case the loom is revolved backward, as often happens, the elements of the said operating connections that most directly actuate the harness levers, are not actuated.

Fig. 1 is an end elevation, and Fig. 2 a side elevation of this improved dobby.

A designates the frame of the dobby, B are the harness levers pivoted on the shaft B′ and actuated by the notched draw bars C and the transverse reciprocating knives D D′ engaging the same and pivoted respectively to the upper and lower ends of the **T**-shaped rocker arms E, pivoted on the frame of the machine. F are the pattern rollers having the pins $f$ which engage and lift the pivoted fingers G at predetermined intervals, which lift the corresponding draw bars, causing the knife D to push the corresponding draw bars, tilt the corresponding jack levers and operate the corresponding heddle frames. The draw bars are returned in the return movement of the reciprocating knives by means of the lower knife D′.

H is the main shaft, having secured thereto and rotating therewith the cam I. J is a lever pivoted at $j$ to the frame of the machine above and in line of movement of the cam I.

K is a lever pivoted on and depending from the lever J, resting normally against the shaft H and having the inturned lower end to which is secured a lug $k$ in line of movement of the cam I. Rotation of the shaft causes the high part of the cam to alternately engage the lever J and lug $k$, imparting a reciprocating vertical swinging movement to the lever J on its pivot. L is a device connecting the lever J and

rocker arm E, and consists of the bar M having a recess, and the bar N having also a recess situated opposite the recess in bar M. These bars are pivoted together at their lower ends, while their upper ends are connected by a spring O. On the free end of lever J is a pin P, which extends into the recesses of the rocker arm actuating bars M and N.

Under normal operating conditions these two bars do not change their relative positions, but are moved up and down in unison by the reciprocation of lever J, causing the arm E by reason of its connection with the upper end of arm M, to rock on its pivot and reciprocate the transverse knives D D'.

Should anything occur in the way of breakage or obstruction to interfere with or prevent the tilting of any particular jack lever and bind the parts directly actuating it, the movement of levers J causes the pin P to spring clear of the recesses in the rocker arm actuating bars M and N, the lever N being moved outwardly on its pivot against the action of its spring O, the bar M and the parts operated thereby remaining stationary.

In the event of any excessive tension in the connections between the jack levers and the heddle frames (due, for example, to heavy warp) which might cause the pin P to spring out of its bearing in the recesses in the rocker arm actuating bars M and N and thus prevent the jack lever from completing its full range of movement, the following mechanism is provided for insuring under these conditions a complete throw of the jack lever and the proper lifting of its corresponding heddle frame.

Q is a lug on the frame of the machine. Before the bars M and N have quite completed their downward movement the outer straight edge *q* of bar N will strike the lug. The time at which the lever N is caused to engage the lug Q is fixed, so that no resistance of the jack lever to further movement due purely to excessive tension will substantially manifest itself until this engagement takes place. During the remaining throw of the lever J there is no possibility of the pin P forcing bar N away from bar M, the lug Q effectually preventing this and consequently the bars M and N will be forced down until the jack lever is thrown to its full extent of movement.

S is a cam on the main shaft for operating locking bar R pivoted on the frame at *r*. This cam has inclined faces, and is so adjusted with respect to the cam I that it engages and moves the locking bar out of engagement with the notches *b* and *b'* on the jack levers during the forward and return throw of the harness levers, but will move said bar into engagement with either notch *b* or notch *b'*, dependent upon whether the harness levers have been thrown up or down, so that said harness levers will be held firmly in either position for the desired length of time.

The loom can be run backward without operating or affecting the mechanism for directly actuating the harness levers, as the cam I instead of depressing the lever K will simply throw it outwardly on its pivot at each revolution; thus the loom has the capacity of reversal without danger of breakage. (*Robert B. Goodyear. Phila.*)

## OLDHAM'S SHEDDING MOTION.

On page 25 of Part I a description of the construction of this shedding motion is given; the object of the new device being to provide a shedding motion to positively control the movement and locking of the heddles.

Fig. 1 is a vertical sectional view of the frame of the dobby containing the immediately connected and moving parts, and shows them in the two directly opposite positions in operation. Fig. 2 is a face view of the movement controlling the double locking mechanism, and Fig. 3 is an end view showing a portion of the eccentric gear wheel on the crank shaft of the loom meshing with a similar eccentric gear, and to which is pivoted a vertical rod for working the machine.

*a* designates the frame of the dobby, supported on the standard *a'*, resting on the loom frame *b*, in which is journaled the crank shaft *b'*. In the frame of the machine, near its inner end, is a transverse bar *d*, upon which swing jacks *h*, to the upper arm of each of which is pivoted a draw bar *e*, provided with three inclined notches *e'*, *e²*, and *e³*, two upon its upper edge and one upon the lower edge. These draw bars are acted upon at their outer ends, so as to be elevated or depressed by pivoted feelers or small levers *g*, that are raised and allowed to fall by the large or small rolls or balls *n* of the pattern chain *x*, the raising or lowering of the draw bars placing the proper notches *e'* or *e³* in a position to be engaged by the sweep of the reciprocating movement of transversely arranged knives *c* and *c'*, sliding in slots 1 and 2 in the walls of the machine.

Connected to the outer end of the arm *f'* of the

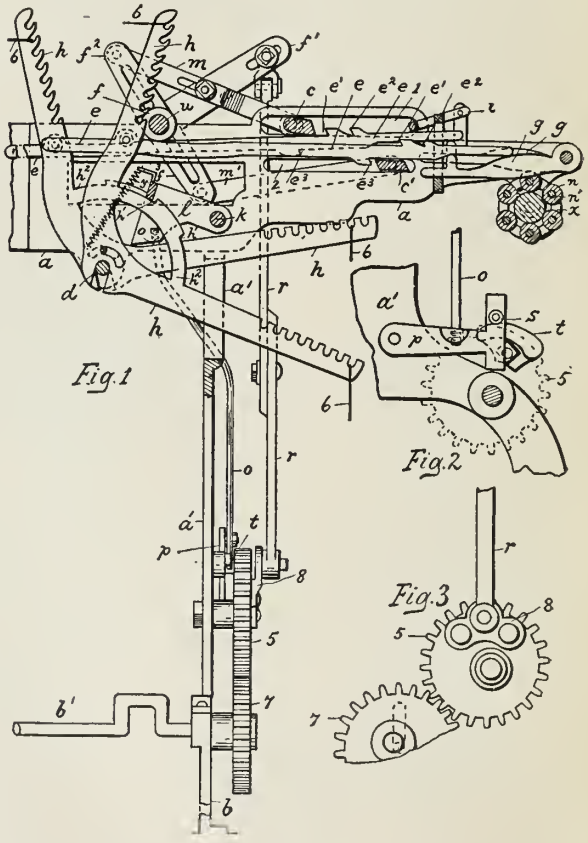


Fig. 1



Fig. 2



Fig. 3

**T**-shaped rocker arm *f* on the transverse bearing or shaft *u*, is an adjustable depending connecting rod *r*, having its lower end pivoted to the bracket 8 on the face of the eccentric gear wheel 5. This rocker arm *f* has adjustable connecting rods *m* and *m'*, pivoted to the outer ends of the reciprocating transverse knives *c* and *c'*. These connecting rods are in turn pivoted to the upper and lower arms *f²* and *f³*, respectively, of the **T**-shaped rocker arm *f*.

Swinging upon the cross bar *k*, also secured in the frame of the machine, is a locking frame *l*, that passes

over all the front edges of the whole number of jacks in the frame and is so constructed as to drop in front or in back, respectively, as shown, of shoulders $h'$, formed on a rib $h^2$ forming a part of each of the jacks $h$.

An additional locking device consisting of a pivoted arm or frame $i$, holds each jack firmly at the highest point assumed by any heddle frame by dropping into the notch $e^2$ when the draw bars $e$ are shifted to the right, the frame $i$ being disengaged from this notch $e^2$ when the pivoted feelers $g$ are dropped by the pattern chain $x$. A vertical rod $o$ connects the locking frame $l$ at the bottom with a **T**-shaped pivoted lever $p$ on the standard $a'$, the said lever being provided with a roller $s$, which is operated upon at times to raise and lower the rod $o$ by the cam $t$, secured to the inner face of the eccentric gear wheel 5.

In the operation of the machine connections being made at 6 with the heddle frames, the power supplied by the crank shaft of the loom is communicated by means of the depending arm $r$, through the eccentric gears 7 and 5, to the vibrating **T**-shaped arm $f$ and by means of the connecting rods reciprocates the transverse knives $c$ and $c'$, and as each or any number of jacks are drawn forward or pushed backward by means of the notched draw bars $e$ to their full stroke, the locking frame $l$ rests in a position on the face of the rib $h^2$ to engage the extension shoulders $h'$ at either point for a sufficient space of time to secure an evenly high or low point to all heddle frames and locking all the jacks firmly at either the forward or backward point in keeping with the heddle frames or harness that are moved or remain stationary to suit the weave. The cam $t$ operates the roller $s$, which in turn raises and lowers the locking frame $l$ by means of the vertical rod $o$, and the jacks are therefore all simultaneously released or locked.

When certain of the heddle frames are not required to be moved subsequently from their highest point downward, they are locked in position to prevent accidental misplacement by causing the frame $i$ to engage the notch $e^2$, this being accomplished by means of the levers $g$, which raise and hold the draw bars $e$ above, so as not to be engaged by the reciprocating knife $c'$. A spiral spring $y$, of sufficient tension, is secured at one end to the locking frame $l$ and at the other end to the dobby frame $a$, to prevent accidental misplacement of the locking frame $l$. The heddle frames have a direct lift and pull down, the notched bars pushing back the jacks by means of the lower knife when forcing the proper heddle frames downward. *(George Oldham, Phila.)*

## COOK'S DOBBY.

The improvement consists in providing means for reducing the number of bars in long harness chains.

Fig. 1 shows a left hand and Fig. 2 a right hand side elevation of this dobby, clearly showing the mechanism for reducing the number of bars in the harness chain.

$a$ is the frame which has bearings for the rock shaft $b$ on which are keyed the levers $b^1$, $b^2$, the former being provided with a crank $b^3$ connected at its end with the pitman $b^4$, which receives motion from the crank shaft of the loom and rocks the shaft $b$. $h$ and $i$ are two pawls pivoted on a stud $h^1$, and having hooks at their ends adapted to engage the ratchets $g^1$, $g^9$ on the end of a shaft to which the chain barrel is secured, and which pawls rotate said shaft.

The object is to use one chain for two weaves by using all the uneven numbered bars for one weave, for example plain, and all the even numbered bars for another weave, which for example we call fancy. The new mechanism is such as to skip one bar for every pick as long as the loom runs straight. When required by the pattern to change to the other weave, a "changing mechanism" is brought in action, which brings the other weave, or bars, in action, keeping said weave in action until the pattern calls for the first weave, when the said "changing mechanism" is again brought in action and the operation repeated.

Besides the harness chain, another chain, a "tappet chain" $o$ is provided (see Fig. 1), the object of which is to operate in turn through suitable connections, levers $h$ or $i$, in turn changing the action of the harness chain $g$ from one weave to the other. The harness chain $g$ is shown in two colors in Fig. 2, viz.: outlines for weave No. 1, full black for weave No. 2. The sprocket wheel, carrying the tappet chain $o$, is fast on the pattern cylinder shaft, the chain of which completes one cycle in the same time as the chain barrel. When the arm $m^1$ is resting against the plain links of the chain $o$, the pawl $m$ is prevented from engaging the teeth of the ratchet $k^{10}$; but when the lug or tappet $o^2$ comes to rest underneath said arm $m^1$, said pawl

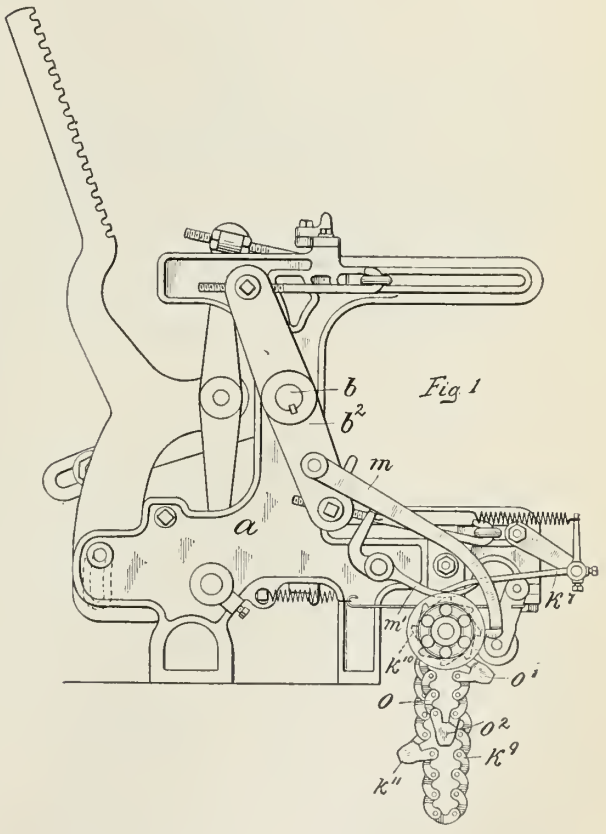
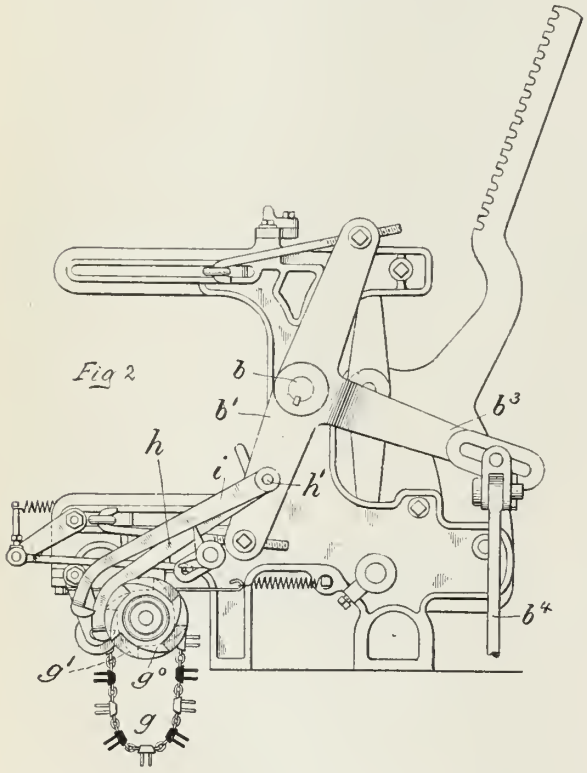


Fig 1

engages the ratchet on the forward stroke of the lower end of the rock lever $b^2$, and on the rearward stroke of the latter the pawl partially rotates the ratchet and moves the tappet chain $k^9$ ahead a distance of one link. Said tappet chain $k^9$ is therefore advanced one link at each complete cycle of the chain barrel. The first tappet $o^1$ on the chain $o$ does not come to rest under the arm $m^1$ so long as the harness chain is operating with its plain bars (or weave No. 1), because since the said tappet $o^1$ is opposite a fancy bar (or weave No. 2), or is an odd number of links away from the second tappet $o^2$, it will be carried past the arm $m^1$ by the action of the pawl $h$ and ratchet

$g^1$ instead of resting underneath said arm. In passing underneath the arm $m^1$, the said first tappet of course raises the arm and the pawl $m$ starts to take a tooth of the ratchet $k^{10}$, but before said pawl can engage the tooth, the tappet $o^1$ has passed underneath the arm $m^1$ and the latter is restored to its normal position, raising the pawl out of contact with the ratchet.




When by reason of the progression of the chain $k^9$ its tappet $k^{11}$ comes underneath the arm $k^7$, the pawls $h$, $i$ are shifted, by suitable connections, and the pattern surface at once begins to feed on the fancy bars (or weave No. 2). It continues to do so until the first lug $o^1$ on the chain $o$ comes to rest underneath the arm $m^1$, as said lug will do since the progression of the chain $o$ is now on the alternate links. When this occurs, the pawl $m$ engages the ratchet $k^{10}$ and moves the chain $k^9$ ahead one link, moving the lug $k^{11}$ out from beneath the arm $k^7$, and thereby reshifting the pawls $h$, $i$. This changes the feed back again to the plain bars of the pattern surface, on which it is kept until the lug $k^{11}$ again comes to rest underneath the arm $k^7$.

It will therefore be seen that the number of times the weave is changed from one to the other and back again depends upon the length of the chain $k^9$, or, more properly, upon the recurrence of the lug $k^{11}$ or number of lugs used. *(Richard H. Cook, Fall River, Mass.)*

## CONNECTING BOX AND SHEDDING MOTION OF DOBBY COTTON LOOMS.

The object of the new mechanism is to arrange the pattern devices or chains which control the harnesses and box motion of a loom, respectively, so that said pattern devices or chains will move together, so that when one chain is advanced or moved back the second chain will be correspondingly shifted. This will obviate any chance for the weaver to disarrange the proper position between harness and box chains after picking out, or the filling having run out, or any similar reason where the loom had to be stopped and the last proper pick ascertained.

Fig. 1 is an end view of a loom, sufficient parts thereof being shown to illustrate the application of the new device, and Fig. 2 is a front view of the new box motion operating device.

A designates one of the side frames of a loom, journaled in which is the driven shaft $e$ which has secured to it a gear $a$, forming a crank disk which, by means of the pitman $f$, is connected to operate the levelers controlling the harness motion. Mounted on the shaft $e$ is a bevel gear $g$, which meshes with and drives a bevel gear $h$, secured upon a vertical shaft $i$, provided with a worm meshing with and driving a worm wheel $j$, which is loosely mounted on the shaft of the dobby cylinder $l$ and normally held in engagement with a clutch $k$ by means of a coiled spring, so that the dobby cylinder $l$ can be turned by the hand wheel $m$ independently of its driving connections.

Mounted on the dobby cylinder $l$ is a plain pattern chain $n$, controlling the harness motion of the loom.

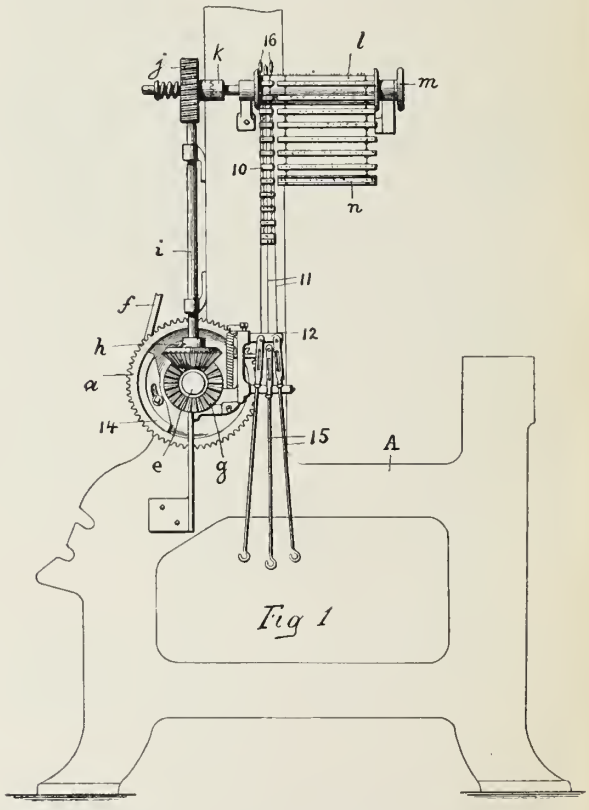


Fig 1

Also mounted on the dobby cylinder $l$, near the inner end thereof, is a second pattern chain 10 controlling the new box motion actuating device. This pattern chain 10 co-operates with a plurality of fingers 16 (three in this instance) which are connected by means of lifting wires 11 to hook pieces 13, mounted in and forming part of the box operating mechanism 12. Bolted upon the face of the gear $a$ is a face cam 14, by means of which power is applied to the box motion operating device 12.

The construction of the box motion operating device is clearly illustrated in Fig. 2. It comprises a bracket or framework 17, bolted to the framework of the loom. Mounted on a stud 40 are pieces 35.

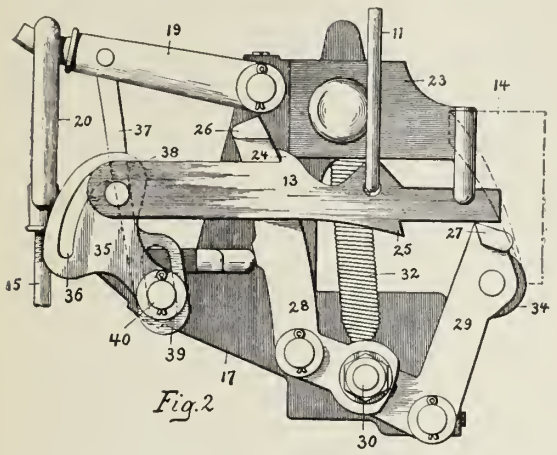


Fig. 2

having cam slots 36. Fitting into the cam slots 36 are rollers 38, journaled on links 37, which are connected at their upper end to the lifting levers 19. The links 37 are guided at their lower ends by slotted sections 39, engaging the stud 40. Connected to the ends of the lifting levers 19 are connecting pieces 20, adjustably threaded into each of which is a lifting rod 15. The lifting rods 15 extend down to that part of the framework of the loom occupied by the box motion, and said lifting rods may be connected at their lower ends either directly to operate the box motion or any form of multiplying device employed in connection with box motions.

The cam slots 36 are shaped at their ends so that when the parts are in the position illustrated in Fig. 2, the lifting lever 19 will be locked in a raised position. The hook pieces 13, which connect to the pivoted pieces 35, are provided upon their upper edges with abutments 24 and on their lower edges with abutments 25 and are held in place and guided by means of a comb 23.

The actuating blades or sweeps 26 and 27 are carried by bell crank levers 28 and 29, the lower arms of the bell crank levers being connected by means of a pin 30, extending from the bell crank lever 28 through a slot in the bell crank lever 29. A coiled spring 32 is connected at its lower end to the pin 30 and normally acts to open or separate the actuating blades or sweeps 26 and 27, as shown in Fig. 2. Journaled in the bell crank lever 29 in position to engage the face cam 14, before referred to, is a friction roll 34. When the cam 14 engages with and acts upon the friction roll 34, the actuating blades or sweeps 26 and 27 will be moved toward each other. When the cam 14 passes out of engagement with the roll 34, the actuating blades or sweeps 26 and 27 will be moved away from each other by the spring 32.

When a peg on the pattern chain 10 passes under one of the hooks 16, the hook 16, through its lifter wire 11, will lower a hook piece 13 so as to bring its lower abutment 25 into the path of the actuating blade or sweep 27. When the actuating blade or sweep 27 is shifted by the cam 14, it will move the hook piece 13 to the position illustrated in Fig. 2, thus lifting up the lifting lever 19, which lifting lever on account of the shape of the cam slot 36 will be locked in its raised position.

If at any time the loom is stopped on account of the giving out of the filling or for any other reason, the operator can turn back or advance the dobby cylinder *l* by means of the hand wheel *m* and the pattern chains *n* and 10 will move together, so that they will always maintain a correct co-operative relation and the loom will always be in condition so that when started up it will correctly weave a pattern. *(Parkhill Mfg. Co., Fitchburg, Mass.)*

## LACEY'S HARNESS OPERATING DEVICE FOR COTTON LOOMS.

The device relates to looms for weaving sateens and similar fabrics for the purpose of sustaining the plurality of harness frames that are used in the production of such fabrics and also for the purpose of causing or insuring the proper reciprocal working of the said harness frames.

Fig. 1 shows, in elevation, portions of a loom for weaving sateens with the embodiment of the new device applied thereto. Fig. 2 is a view of certain

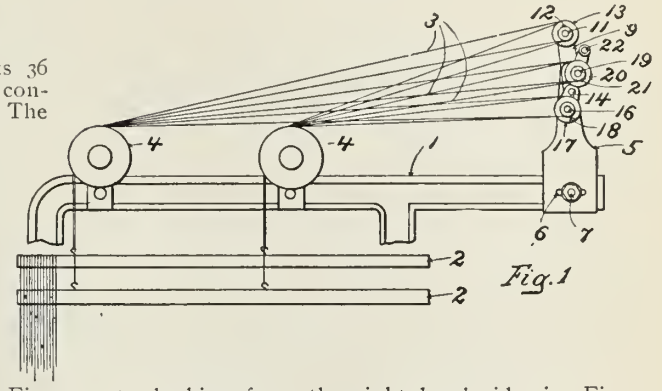


Fig. 1

parts, looking from the right hand side in Fig. 1. Figs. 3 to 7 are views illustrating the various modes of using the improved devices.

1 designates the loom frame, 2 the harness, 3 the harness straps, and 4 the sheaves over which the said straps pass.

5 designates an adjustable bracket applied to the arch of the loom frame by means of slot 6 and bolt 7. On this bracket 5 is mounted a stud 8, upon which latter in turn is mounted the "main" or "supporting" lever 9, turning upon the said stud as on a pivot.

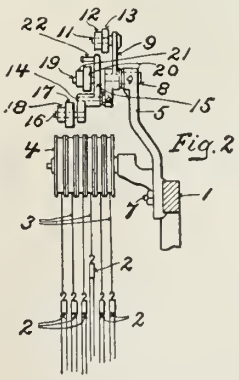


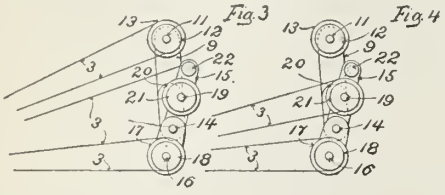
Fig. 2

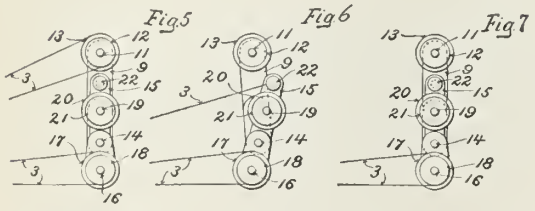
To the upper arm of lever 9 is applied stud 11, on which is mounted to turn a pair of harness rolls 12 and 13 connected to turn together, the rear roll 13 being slightly the greater in diameter.

14 designates a stud applied to the lower arm of lever 9, and on the turned or cylindrical projecting portion of the said stud 14, the secondary lever 15 is mounted with capacity to turn. 16 designates a stud carried by the lower arm of lever 15, and 17 and 18 designate harness rolls mounted to turn on the said stud, the said rolls being connected to each other, so as to rotate in unison, and differing in diameter, as in the case of rolls 12 and 13.

19 designates a stud applied to the upper arm of

lever 15 and having mounted thereon a pair of harness rolls 20 and 21, connected to turn together and differing in diameter. 22 designates a second stud applied to the upper arm of lever 15.




The new device is capable of working with six harness frames. Illustrations show the manner of connecting and operating the harness cording or straps 3. The latter are in part omitted from Fig. 2 in order to better illustrate the novelty of the new devices.

With six harness frames in use the front harness frame will be connected by its straps to the front roll 18, the second harness frame to roll 17, the third harness frame to roll 21, the fourth harness frame to roll 20, the fifth to roll 12, and the sixth harness frame to the roll 13.

When it is desired to employ but five harness frames, the strapping will be connected as in Fig. 3, in which latter the rolls 18, 17, 12, and 13 are utilized in connection with the straps from the first, second, fourth and fifth harness frames, respectively, the strap from the third harness frame being connected with the stud or pin 22.

When it is desired to employ only four harness frames, the straps from said harness frames may be connected with the rolls 18, 17, 21, and 20, respectively, as indicated in Fig. 4. In this case, if desired, the main lever 9 may be held in a fixed position by locking means. If desired, the straps from the four harness frames may be connected with the rolls 18, 17, 12, and 13, as in Fig. 5 and in this case lever 15 will be locked to the main lever 9, so that the said levers shall turn as one upon stud 8.

When it is desired to use only three harness frames, the straps therefrom will be connected, respectively, with the rolls 18, 17, and with the stud or pin 22, as in Fig. 6, all carried by lever 15, the said levers being left free to turn with reference to lever 9 the latter, if desired, being held locked in a fixed position.

When it is desired to use only two harness frames, the straps from the said harness frames will be connected with the respective rolls of any one pair of the three pairs of harness rolls —as, for instance, the rolls 18 and 17, as shown in Fig. 7—and the two levers 9 and 15 may, if desired, be locked to render them immovable.

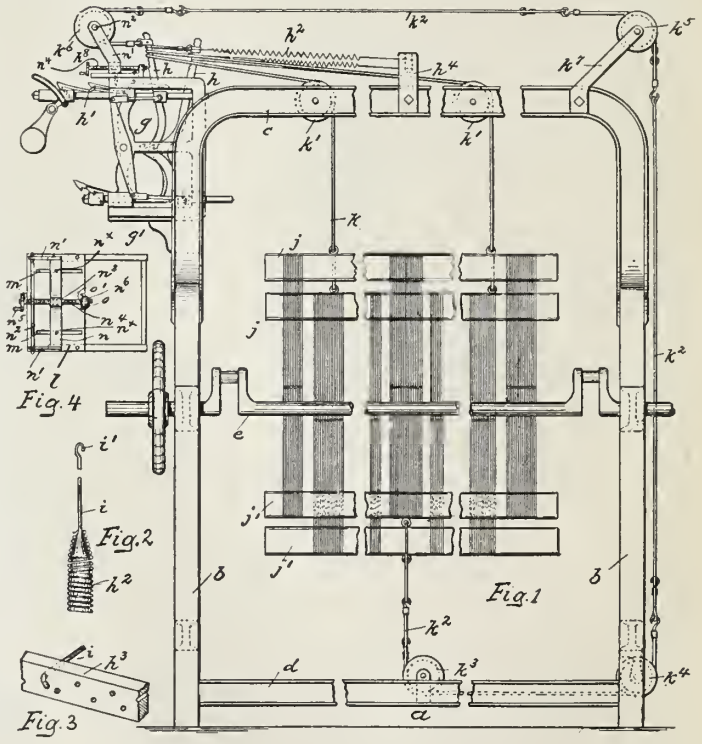
The devices which have been thus described can be used for working four, three, or two harnesses without holding or securing the levers, if desired. For convenience in locking or holding the levers when desired or required, the devices are provided with locking means.

When it is desired to work four or three harness frames without holding the levers, lever 9 may be allowed to fall or turn partly over under the strain which is transmitted through the harness connections, so that its lower arm shall extend inwardly, or lever 9 may be omitted, and lever 15 applied to the supporting stud 8. In working two harness frames, the levers 9 and 15 (in case the entire arrangement is retained in place) may be permitted to swing inward under the strain that is transmitted through the harness connections. If lever 9 is removed and lever 15 mounted on stud 8, then in that case lever 15 will be allowed to swing, as noted. If desired, both the levers may be removed and a pair of rolls corresponding with 17 and 18 mounted on the supporting stud 8 for two harness work.

The mechanism is self contained and complete for six harness frames or less; all strappings from the various rolls are in line with the respective harness frames to be operated; only one size of double pulley or pair of rolls is only required to be used in each of the places where the same is represented in the drawings; and the mechanism is so designed as that the stud 8 of the bracket 5 constitutes the support of either the entire combination of movable levers and rolls, or of a single lever, or of a single double pulley, or pair of rolls. *(Fred. Lacey, Valleyfield, Canada.)*

## ARIENTA'S SHEDDING MECHANISM.

Fig. 1 is a front view of a portion of a loom frame, showing the disposition of the mechanism thereon,




and which more particularly refers to the strapping of the harnesses. Figs. 2, 3, and 4 are detail views of the mehanism.

*a* indicates the loom frame, consisting of end stand-

ards $b$, surmounted by top frame $c$ and connected near their bases by rail $d$. $e$ designates the main shaft journaled near its ends in the two standards $b$.

$g$ designates the dobby, supported upon brackets $g'$ upon the top frame $c$, and which dobby is operated from the main shaft $e$ of the loom. $h$ are the harness levers controlled by the jacks $h'$. The upper ends of these harness levers are normally held inwardly by the tension of spiral springs $h^2$, by which they are connected to a perforated cross bar $h^3$, supported upon the brackets $h^4$ upon the top frame $c$. Each of these springs $h^2$ is tapered somewhat at each of its ends and receives one end of a connecting rod $i$, said end being enlarged and conical in shape, so as to prevent its separation from the spring, as shown in detail in Fig. 2. The rod at one end of each spring is provided at its free end with a hook $i'$, for engaging the upper end of its corresponding harness lever $h$, whereas the rod at the other end extends through one of the apertures in the perforated cross bar $h^3$, its extremity being bent so that it cannot be withdrawn through said aperture, as shown in Fig. 3.

$j$ designates the upper set and $j'$ the lower set of the harness frames. Said upper harness frames $j$ are connected with the upper ends of the harness levers $h$ by cords $k$, which pass over pulleys $k'$, journaled in the top frame, and the lower heddle frames $j'$ are connected with said upper ends of the harness levers by a series of cords $k^2$, which extend downwardly under pulleys $k^3$ and $k^4$, journaled in the lower part of the loom frame, and then up along one end of the latter over pulleys $k^5$ and $k^6$, respectively journaled in brackets $k^7$ and $k^8$, the former of which is supported upon the top frame of the loom and at one end thereof and the other of which is supported upon the dobby frame thus:

Spanning the dobby frame is a plate $l$, bolted thereto and provided with slots $m$ extending longitudinally of the dobby frame. The bracket $k^8$ is supported upon this plate $l$ and provides bearings for the pulleys $k^6$, consisting of an elongated base plate $n$, having forwardly and upwardly projecting arms $n'$ at its ends, said arms being connected by a shaft $n^2$, upon which said pulleys are journaled. The base plate $n$ has downwardly extending pins $n^x$, which project into the slots $m$ so as to guide the bracket, and it is provided midway with an enlargement $n^3$, through which projects and with which engages a screw $n^4$, having a hand wheel $n^5$ for rotating it and being journaled at its other end in a projection $n^6$, mounted on a plate $l$. Collars $o$ and $o'$, mounted on said screw on each side of the projection $n^6$, prevent longitudinal movement of said screw. It will be seen that by manipulating the screw $n^4$ the cords of the harness may be tightened or slackened at will. *(Secondo Ariculta, Paterson, N. J.)*

## HILTON'S HARNESS MOTION.

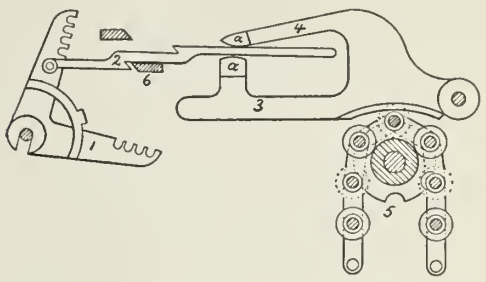
The objects of the mechanism are to make the pattern chain act positively and prevent mispicks in the pattern by a wrong movement of the heddles. This result is obtained by combining with the vibrator finger or lever a yoke that prevents a rebound of the jack when dropped by the roller in the pattern chain.

The illustration is a diagram showing a face view of a right angled lever, a jack, an improved vibrator lever and a section of a roller pattern chain.

1 represents the right angled harness lever, 2 the double hook moving jack, 3 the vibrator lever, 4 the yoke, and 5 a section of a roller pattern chain.

The new device consists in the yoke 4, combined with lever 3 and jack 2. The yoke 4 is cast to and forms a part of the lever 3. The jaw $a$ is such that it permits the jack 2 to freely slide between.

When looms are run at a high speed, the roller pattern chain 5 moves quick, and when the roller drops




the lever 3 (if no yoke to prevent) sometimes the lever 3 rebounds and knife 6 will miss the bottom hook in jack 2 and make a mispick. If lever 3 is provided with the yoke 4, a miss cannot happen. *(John Hilton, Phila.)*

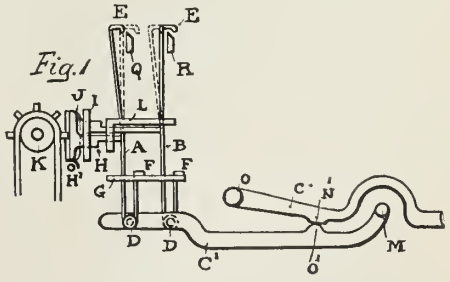
## WHITE'S DOBBY.

The construction refers more particularly to dobbies of that class in which hooked **U**-shaped spring catches are employed for lifting the jacks. Hitherto in this type of dobby two pattern cylinders have usually been employed, the pegged lags of which have acted direct on the catches, thus necessitating a double reading of the pattern and involving a considerable complication of the working parts.

The object of White's Dobby is to simplify the mechanism by the employment of a single pattern cylinder arranged to act on **T**-shaped needles, which are operated by the pegged lags of the pattern cylinder in such a manner as to throw the hooked extremities of the **U**-shaped spring catches into position to be raised by the lifting knives of the dobby.

Fig. 1 is a detailed view of this dobby, showing the means for actuating the jack levers. Fig. 2 is a back view of the dobby.

A and B are the **U**-shaped spring catches, each of which is made with a long and short leg. The long leg projects upward and is formed with a catch extremity E, while the short leg is also formed with a bent end or catch F, which rests on a cross bar of




the grate G, as secured to the dobby frame, when in its normal position. The spring catches are secured at the bent lower end portions of their long and short legs to the jack levers C by studs D.

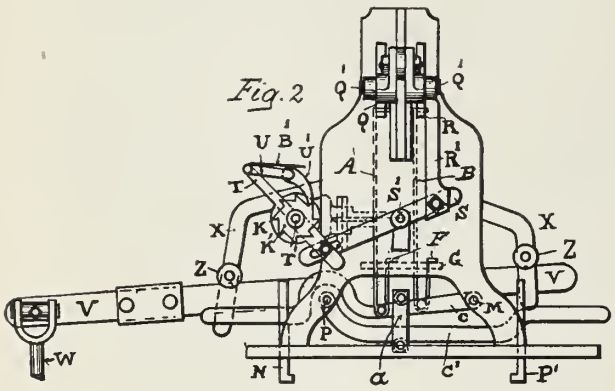
H and J are **T**-shaped needles, which are acted upon by the lattice pegs on the pattern barrel or cylinder K. The needles are notched, to limit their movement in the grate L. The long needles J act upon the spring catches B, while the short needles H

act upon the catches A. The needles are supported in the grates I and L, the grate L also serving as a guide for the spring catches A and B, as shown.

The jack levers C carry the spring catches, and are pivoted at M and their other extremities move in the grate N. From jack lever C a central link or connection *a* is made to the jacks C′, pivoted at P, so that on the lifting of the jacks C, jacks C′ will be simultaneously lifted, and consequently the harness attached to them will be raised. The jacks C′ work in the grate P′.

In Fig. 1 the links *a* and antifriction bowls shown in Fig. 2 are dispensed with, and the jack levers are so mounted and constructed that on the raising of the lower jack lever it will simultaneously raise the jack lever above it. In this view the **U**-shaped spring catches A and B are shown secured to the lower jack lever C′, pivoted at M. The jack lever C above it is reversely pivoted at O. On the lower jack lever C′ is formed a swell or lug O′, which when the lower jack lever is raised by the **U**-shaped spring catches A and B in the manner described bears against the projection N, cast upon the under side of the jack lever C, thereby raising the said lever C′ simultaneously with the lever C. By this means we are enabled to obtain an equal lift of the harness as attached to the jack levers.

The action of this improved dobby is thus: Just according to the pegging of the lags on the pattern cylinder K the needles H and J will, as the case may be, thrust forward the spring catches A or B, so that




their catch extremities E will come into position to be raised by the lifting knives Q and R of the dobby. When the needles H and J are relieved from the lattice pegs on the pattern barrel K and the spring catches A and B are released, the spring catches will spring back out of active position as shown in dotted lines in Fig. 1. At the same time the spring catches will cause the return of the needles H and J in readiness to be acted upon by the succeeding pegs of the lattice barrel. A projecting lip on the said needles limits their return movement by coming against the rod H′.

The operation of the lifting knives Q and R is effected by rocking lever V, actuated by connecting rod W, operated from an eccentric or crank on the tappet shaft of the loom. Rocking lever V gives an alternate movement to two arms X, whose ends are passed through slotted brackets (not shown, being situated on the other side of the lever V) in rocking lever V and are supported upon the same by bowls Z, which rest in a slot, groove, or indenture formed in the top edge of such lever. The arms X are connected to the respective lifting knives Q and R, and which they operate. Should any working part get stuck fast, the rocking arm V will continue to work independently of the arms X, thus preventing any damage.

The lifting knife R, about midway of its length, has attached to it a branch arm R′, which with the fall or gravity of the arms X, on being relieved from the rocking lever V operates the two armed lever S, pivoted at S′. The other extremity of the lever S is connected to another two armed lever T, centrally pivoted on the shaft T′ of the pattern barrel K. Fixed to the lever T is a small link U, carrying pawl or catch U′, which engages with the ratchet wheel K′ and turns pattern barrel K, a small blade spring B′ keeping the catch U′ in gear with the said ratchet wheel. *(W. B. White, Jr., Colne, Eng.)*

## SCHAUM'S HEAD MOTION FOR NARROW WARE LOOMS.

This shedding motion is placed on the frame of the loom in an elevated position, instead of at the base of one of the ends of said frame. The harness levers are arranged relatively to each other and to their actuating cams so as to effect a minimum of friction between moving parts and at the same time provide self lubricating means between frictionally contacting parts. The actuating cams for these harness levers are arranged relatively adjustable, a simple device for leveling the harness levers as occasion requires being provided.

Fig. 1 is a front elevation of a portion of the end of a loom frame, showing the shedding motion. Fig. 2 shows in its side elevation (drawn on a larger scale than in Fig. 1) one of the harness levers.

*a* designates one of the end frames and *b* the arch, which is formed with a bearing *c*, in which is journaled a horizontal shaft *d*, held in position by a bridge piece *e*. One end of the shaft *d* (the one not shown in Fig. 1) carries a bevel gear which intermeshes with another bevel gear upon the upper end of a vertical shaft which is connected with the driving mechanism of the loom, and by which means shaft *d* is rotated.

Shaft *d* carries a set of elliptical cams *f*, and also a face plate *g*, to which the various cams are secured by bolts $g^1$, which penetrate concentric slots $g^2$ in the cams, and by which arrangement said cams are made relatively adjustable about the shaft *d*.

*h* designates the harness levers, each of which has at its lower end an enlargement $h^1$, having an obliquely set notch $h^2$, which works on a horizontal supporting rod *i*, constituting an integral connection between the two arms (one of which $i^2$ is only possible to be shown in Fig. 1) of a bracket *j*, having a supporting plate whereby it is bolted to the end frame *a* of the loom. Slightly above the recess $h^2$ each harness lever is formed with an elongated arc shaped slot *k*, which, when the several harness levers are assembled and mounted in position upon the bracket *j* is penetrated by a removable rod projecting through and connecting the arms $i^1$, $i^2$ of bracket *j*.

The forwardly extending arm *l* of each harness lever is formed upon one of its faces with an integral circular projection $l^1$, being formed with a cavity, which has a duct at its bottom and an opening $l^2$ provided in the outer wall of said projection. The opposite face of the arm *l* of each harness lever is perfectly flat.

An annular roller surrounds and is journaled upon each of the projections $l^1$, and to which said roller corresponds in thickness. This roller constitutes an antifriction element, adapted to bear against the cam corresponding to the particular harness lever upon which it is mounted. These rollers are held in place

by the harness levers, except the one on the end which is held in place by a disk secured to the face of the projection, by a screw.

The cavity $l^2$, which is formed in each projection, is a receptacle for the lubricant, and for this purpose

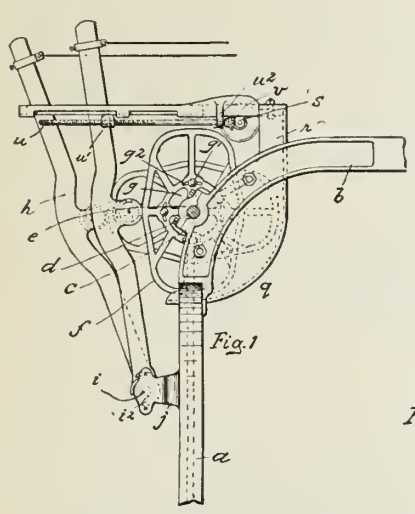


Fig. 1

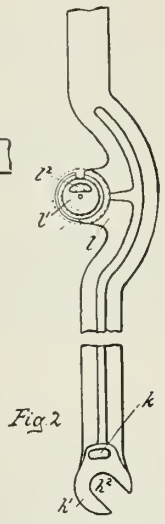


Fig. 2

it contains a body of felt, which will readily become saturated with oil. $q$ designates a fender, bolted between and to the top rails $b$, and which prevents any particles of oil, etc., from being thrown by the cams on to the fabric. The upper portion $r$ of said fender projects some distance above the cams, and supports the leveling device, which consists of a supporting plate bolted to the top of the upwardly projecting portion $r$ of the fender $q$, and is provided with a series of longitudinal slots for the reception of the various harness levers. This supporting plate is formed on its under face and near its rear end with lugs $s$, which provide bearings for a horizontal shaft, having a hand wheel at one end.

Underneath this plate another plate is placed, having grooves shaped correspondingly to the edges of the supporting plate; the two plates being connected by a dove tailed arrangement. $u$ designates a threaded shaft which is tapped into a laterally projecting lug $u^1$, formed on the movable plate, and which penetrates still another lug $u^2$, projecting from the side of the top or supporting plate. The adjoining ends of the two shafts $s$ and $u$ are connected by bevel gearing $v$. Thus when the hand wheel previously referred to is manipulated, the motion of the shaft $s$ is transferred on to the threaded shaft $u$, and consequently to the movable plate, which has openings in it which admit the harness levers, and when it is moved forward or outwardly the edges of said openings will engage the various harness levers, which are being drawn upon by the harness, and bring them all into the same plane and ultimately all out of engagement with the cams. A stop is formed upon the under side of the supporting plate, adapted to limit the inward movement of the movable plate. *(O. W. Schaum, Phila.)*

## BRINDLE AND STEERE'S NARROW WARE LOOM.

The new construction relates to narrow ware looms—such as used for weaving tape, webbing, fringe, ribbon, etc.,—and has for its object to increase the capacity and effectiveness of such looms. Fig. 1 represents a vertical sectional view of such a loom, and Fig. 2 a front elevation thereof.

$a$ designates the loom frame, $b$ the drive pulley, mounted at one end thereof on the crank shaft $d$, and $c$ designate two lays mounted at opposite sides of the loom on lay swords $c'$. The crank shaft $d$ has cranks $d'$ connected by pitmen $d^2$ to the respective lays $c$.

For equalizing the strain and wear on the parts, due to the operation of the lays, those cranks $d'$ which operate the lay $c$ on the right side of the loom are set at a half turn or one hundred and eighty degrees from the cranks $d'$, which operate the lay $c$ on the left side of the loom, so that the two lays when the crank shaft $d$ is revolved alternately approach and recede from each other.

The harnesses $e$ are mounted in guides on the loom frame and are positively operated by bell cranks $e^2$ connected by links $e^3$ with the harnesses and by longitudinal rods $e^4$ with harness levers or jacks $f$, hooked at their upper ends and fulcrumed on a rod $f'$. The two sets of levers or jacks $f$ for operating the harnesses on the two sides of the loom are operated by two sets of path cams $g$ on a cam shaft $g'$, the levers having rolls occupying the paths in said cams. The shaft $g'$ is mounted in bearings attached to the loom frame $a$ and is provided with a bevel gear, which meshes with another bevel gear mounted on the end of a shaft $h$, which runs longitudinally of the loom and is connected by gearing $y$, $y'$, $y^2$, with the driving pulley $b$ on the crank shaft $d$.

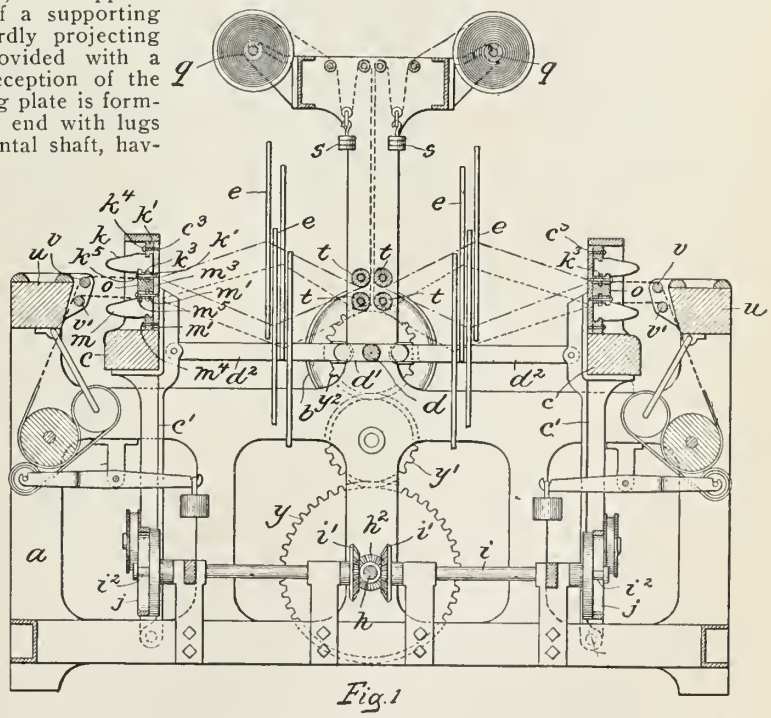


Fig. 1

$k$ and $m$ are the shuttles arranged in two banks, the one above the other on the lay $c$. $k'$, $m'$, are shuttle guides or races attached by screws $k^4$, $k^5$, and $m^4$, $m^5$, to the top portion or back frame $c^3$ of the lay. Between the shuttle guides of each series are located

the reed spaces occupied by the reeds $k^2$, $m^2$. The reeds $k^2$ belonging to the upper set or bank of shuttles are located directly above or opposite the shuttle rests or guides provided for the lower set of shuttles, and, *viee versa*, the reeds $m^2$ of the lower bank are located opposite the shuttle rests of the upper bank.

Each of the shuttles $k$ $m$ is provided with an individual rack $k^6$ $m^6$, the racks of the upper bank being on the lower side of the shuttles, and those of the lower bank being on the upper side of the shuttles, and located in slots in the inner or adjoining guides $k'$ $m'$ of each shuttle bank, are small gear pinions $k^3$ $m^3$. Two of these pinions are provided for each shuttle, and the screws $k^5$ $m^5$, which attach the inner guides $k'$ $m'$ to the lay back $c^3$ serve as shafts or pintles for said pinions. Located between the upper and lower sets of pinions $k^3$ $m^3$ and running longitudinally of the lay $c$ is a single rack bar $o$, having racks $o'$ $o^2$ on its upper and lower edges engaging the teeth of the two sets of pinions $k^3$ $m^3$. At intervals along the rack bar $o$ the latter is formed with slots $o^3$, occupied by headed screws or guide studs $o^4$, screwing into the lay, whereby the rack is guided in its longitudinal movements.

The reciprocation of the rack bar $o$ operates both sets of shuttles $k$ $m$ simultaneously across the reed spaces in front of the reeds $k^2$ $m^2$.

Shafts $i$ with bevel gears $i'$, meshing with a bevel gear $h^2$ on the shaft $h$ are provided for operating the rack bars $o$ on the two sides of the lay.

Each shaft $i$ has at its outer end a crank $i^2$, operating in a vertical slot formed in a slide $j$. The latter is mounted in guides on the loom frame, and is connected with opposite ends of the rack bar $o$ by means of rods $j'$ and straps $j^2$, the latter of which pass over guide pulleys $p$ $p'$ on the lay $c$. The shaft $h$ is rotated from the belt pulley $b$ as before described, and its rotation imparts motion to the crank $i^2$, and it in turn reciprocates the slide $j$, thereby moving the rack bar $o$ to and fro in the lay $c$. The gearing is so proportioned as to move the rack bar once for each backward oscillation of the lay.

$q$ indicates the two warp beams, $s$ the tension weights for the several sets of warp threads, and $t$ the guide rods or rolls for the warp threads. $u$ represents the two breast beams carrying breast rods $r$, $r'$, over which the woven fabrics pass.

The novelty of the new arrangement consists in locating the reeds in one bank opposite the shuttle rests of the other bank, and *vice versa*, so that fabrics woven by the respective banks of shuttles and reeds will alternate with each other. This permits the fabrics to be led to their respective take-ups without changing their vertical direction, and it also puts each fabric in sight and permits ready access to each fabric. The arrangement, furthermore, prevents the chafing of the warp threads in the two sets of reeds, which would occur were the fabrics superposed or formed one directly above the other and the top threads of one shed allowed to cross the bottom threads of another shed; again different kinds and colors of yarn for the upper and lower fabrics may be used. *(Thomas Brindle and Merrill O. Steere, Pawtucket, R. I.)*

## STEERE'S SHEDDING MOTION FOR NARROW WARE LOOMS.

The object is to do away with overhead arches of the loom frame, in order that the weaver has a clear view over the whole of the loom and all parts of the warp and warp shed; also, giving convenient access to the cams which operate the harnesses from below.

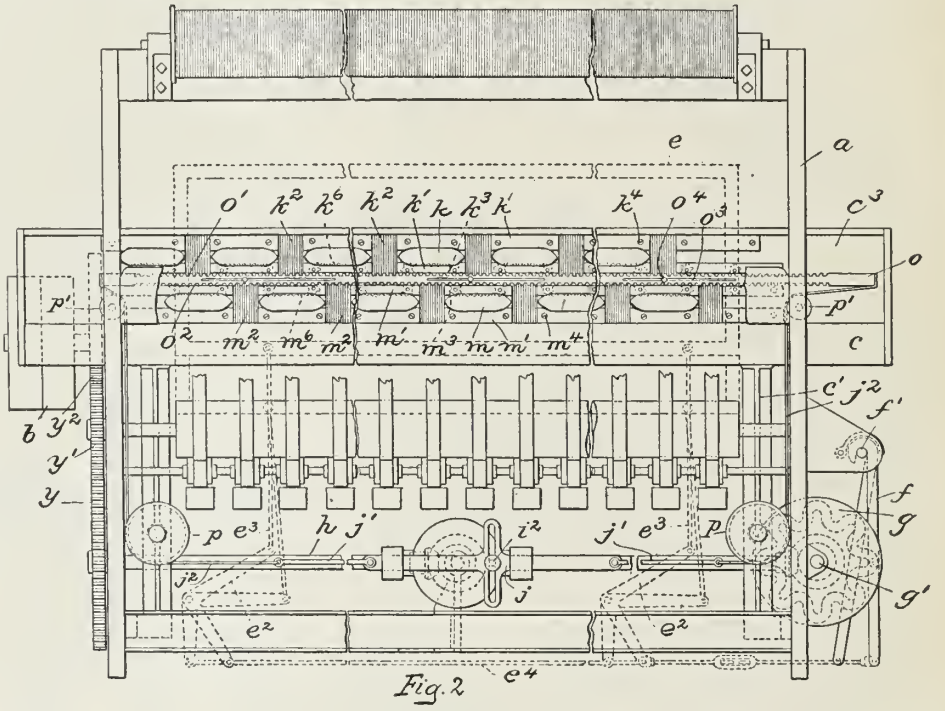



Fig. 2

The illustration shows a longitudinal view of a loom with the device applied thereto, the harnesses being arranged for a double bank shed.

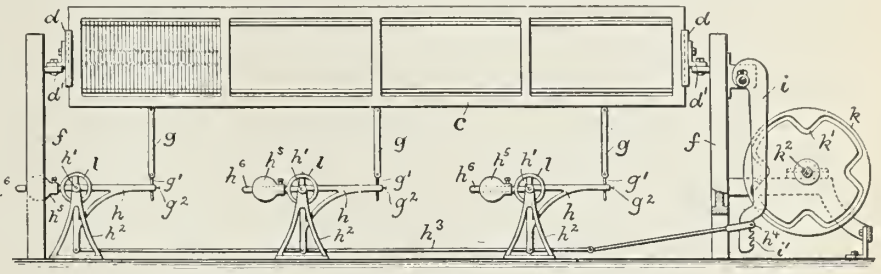
$d$ designates the guides, in which the harnesses $c$ slide up and down, and which are supported by the brackets $d^1$ on the inside of the end frames $f$.

The harness frames are connected by means of a screw, having a flat perforated head, with the lifter bars $g$, which are pivotally connected to the posts $g^1$ secured by a clamp screw $g^2$ to the horizontal arm of the bell crank levers $h$, and whereby said lifter bars $g$ can be accurately adjusted so as to move all parts of the harness frames, and support them equally in all positions.

Each bell crank lever $h$ is journaled on a shaft $h^1$, supported on frames $h^2$. The vertical arms of the bell crank levers $h$ are pivotally connected with a rod $h^3$, the end $h^4$ being connected to a lever $i$, which is connected at its upper end to a bracket secured on one of the end frames $f$, and is provided at its lower end with hooks $i^1$ for regulating the speed of the rod $h^3$, and thus in turn regulating the raising of the har-

nesses, *i. e.*, size of shed. The lever *i* is provided with a stud, which extends into the cam slot $k^1$ on the cam disk *k*. Each harness frame is connected with three or more of the bell crank levers *h*, and each harness frame is operated by a separate rod $h^3$, a separate lever *i* and a separate cam disk *k*.

The number of cam disks equal the number of harness frames used in the loom, and are secured to the shaft $k^2$ in the positions required to move the several harness frames at the predetermined time according to the weave. The cam slot $k^1$ is formed as shown in the illustration to operate the harness frame connected therewith four times for each revolution of the cam disk *k*, but may be arranged to suit other changes.



To secure the accurate movement of the bell crank levers *h*, they are provided with the annular rings *l*, the faces of which are finished and form a bearing on the ring of the adjacent bell crank lever, thereby holding the arms of the levers in the required position, allowing the bell crank levers connected with different warp frames to move independent of the adjacent levers and in a true vertical plane.

The weight of each harness frame is as near as possible counterbalanced by the weight $h^5$, adjustably secured to the extension $h^6$ of the horizontal arms of the bell crank levers *h*, thereby reducing the friction on the cams. *(O. A. Steere, Pawtucket, R. I.)*

## ADJUSTABLE HARNESS MOTION REGULATORS FOR NARROW WARE LOOMS.

The object is to so construct the harness controlling mechanism of narrow ware looms (as used for weaving hat bands and similar fabrics) that the action thereof will be rendered as even and uniform as possible and devoid of all unnecessary jar; permitting also special adjustment for the harness with reference to shed required, in turn giving the fabric woven luster.

The general construction of a narrow ware loom is too well known to need special illustration or description, hence we will refrain from that part in a general way, only dealing with such parts of the loom to which this mechanism more particularly refers to.

Fig. 1 shows this shedding motion; Figs. 2 and 3 being views in detail.

*o* is the cam shaft, journaled in one of the end uprights of the loom frame and also sustained partly in bearing brackets *s* disposed outside of the frame, and arranged between said brackets. Mounted on said shaft are cams *j*, against which are adapted to bear rollers *k*, carried on levers *l*, that are fulcrumed in a bracket *m* back of the brackets *s*, said levers extending subjacently with reference to the cams and being movable in a true vertical direction by virtue of guide *n*.

Motion is imparted to shaft *o* by means of a gear fastened to its inner end and meshing with another gear connected to the driving shaft, as extending throughout the length of the loom. From the upper portion of the loom frame projects outwardly over the cam motion structure described, in an inclined position, a pair of arms or brackets *t*, having their upper edges correspondingly notched for the reception of squared shafts *u*, the ends of which are reduced to form trunnions which seat in said notches. Each shaft carries a sheave *w*, over which passes and to which is secured by means of a pin or screw *x* a strap or band *y*, the ends of each strap being connected, respectively, to those cords for the particular harness to which motion is to be transmitted. On each of said shafts *u* is also mounted a pair of double sheaves *z*, the one being slightly larger than the other and their common hub *a* being provided with a set screw *b*, whereby the double sheave is adjustably secured on the shaft.

Over one of the sheaves of each double sheave extends a belt or band *c*, the ends of which are connected to the upper ends of hook rods which carry removable weights *c'* at their lower ends into which are screwed the threaded shanks of hooks *c*, engaging eyes *f*, carried by the levers *l*. By adjusting each hook in the weight the belt *c* may be maintained in effective engagement with either portion of the double sheave, and so the lift of the harness can be regulated.

*g* designates a rod which is threaded and screwed into each shaft *u*, which it penetrates and in which it is sustained at an incline in the normal position of the shaft—*i. e.*, that indicated in Fig. 2. A binding nut *h* helps to secure the rod in the position to which it is adjusted. The lower end of the rod carries a weight *i*. By turning the rod in the shaft the position

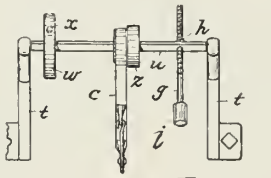


Fig. 1

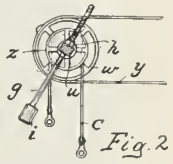


Fig. 2

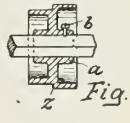


Fig. 3



of its weight *i* relatively to the shaft will be altered, and by this means the action of the harness controlling mechanism regulated to suit the character of the fabric woven.

In place of leaving the upper end of each rod *g* as protruding out of shaft *u* free, as shown in Figs. 1 and 2, each one of these ends may be secured by spiral springs to a conveniently placed frame and thus the rods maintained in an inclined position. These springs will with this arrangement not only assist the weighted rods in regulating the action of the harness controlling mechanism, but at the same time effect the prompt return of its parts to their respective rest positions. *(G. Kremer and E. Monhof, New York.)*

# BOX MOTIONS AND SHUTTLE BOXES.

### THE CROMPTON SHUTTLE CHANGER.

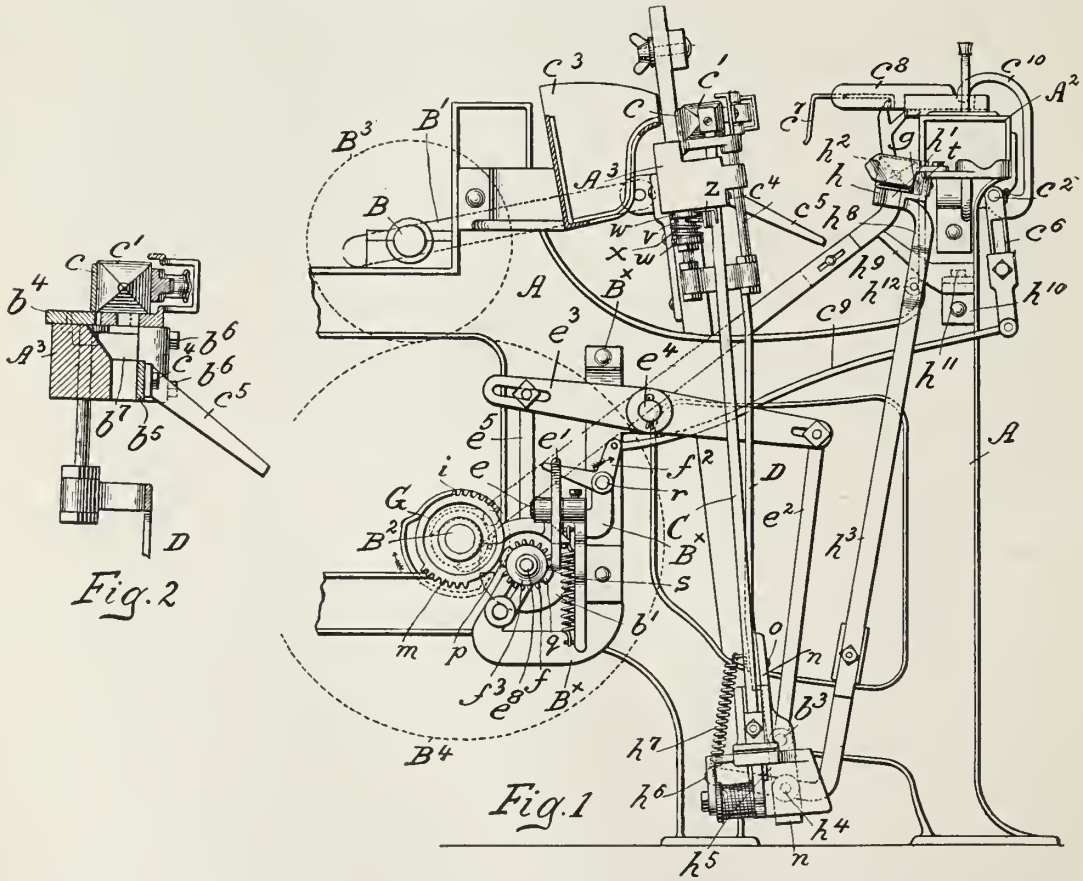
This mechanism has for its object to change the shuttles automatically when the filling is broken or exhausted.

Fig. 1 is a left hand end view of a portion of a loom with the parts represented in the position when the loom is running regularly. Fig. 2 is a sectional detail of the running shuttle box, drawn to a slightly enlarged scale compared to Fig. 1.

A represents the loom frame, $A^2$ the breast beam, $A^3$ the lay, B the crank shaft, B' the pitman connecting the crank shaft to the lay, $B^2$ the cam shaft and $B^4$ a gear wheel (shown dotted in its outline), which meshes with another gear wheel $B^3$ also shown (dotted) in its outline. The cam shaft $B^2$ carries a gear G, having two sets of teeth $i$ and $m$.

The loom frame has mounted upon it near the cam shaft, a stand $B^x$ having bearings for a shaft $e^8$, which has at its inner end a disk $b'$, over which is fitted a on it a mutilated gear $f$, which has two teeth removed from one side to leave an empty space and at its opposite side has a large tooth $q$, the shaft $e^8$ having fitted on its outer end a forked gear $f^3$, provided with a tooth $p$, said forked gear being free to slide on the shaft $e^8$. When in inoperative position the space on one side of the gear faces one set of the teeth $i$ and $m$, being out of engagement with the same.

When the filling breaks, the filling fork carrier $c^8$ is moved backward, carrying the filling fork $c^7$ with it and turns the lever $c^{10}$ which is connected with a rock shaft $c^2$ having an arm $c^6$ to which is attached rod $c^9$ jointed to an elbow lever $f^2$ pivoted at $r$ on the stand $B^x$. One end of said lever $f^2$ enters a slot in a second elbow lever $e'$ mounted on a stud $e$ of the stand and having at its lower end a roller $s$ which enters a groove in the sliding gear $f^3$. By this movement of the rod $c^9$ the large tooth $q$ of the gear $f$ comes in contact with the teeth $i$ on the cam G, turning said gear half a revolution, then as the other set of teeth







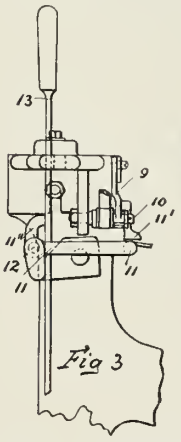
link $c^5$, connected at one end to the lever $e^3$ which is pivoted at $e^4$ to the loom frame, said lever being connected at its other end to a link $e^2$ which in turn fits over a stud $b^3$ extended from a block $n$ attached to the shuttle box rod D by a screw $o$. The shaft $e^8$ has fast $m$ comes around, it moves the gear another half revolution. This raises the rod D as attached to the shuttle box. The casting $b^4$ (shown in Fig. 2) as applied to the lay, has rising from it a shuttle aligning wall $c$, which constitutes the back for the running

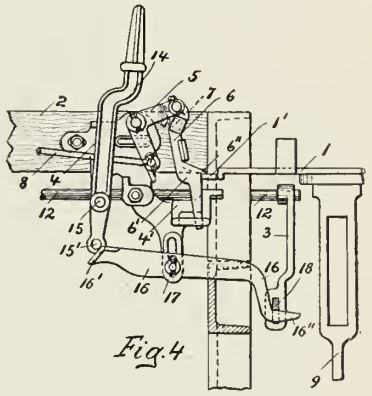
shuttle box, *i. e.*, when the latter is in its operative position in line with the race of the lay; but when the said shuttle box is put into its inoperative (*i. e.*, raised) position by the lifting of the rod D as previously described, then said wall no longer constitutes the rear side of said shuttle box and the shuttle $c'$ is free to escape laterally from said box over the wall $c$ and into the receptacle $c^3$ (see Fig. 1) this, the shuttle being forced to do, on the second back stroke of the lay. The casting $b^4$ is attached at its end to the lay by two bolts $b^6$ and presents a bar $b^5$, the top of which being located below the level of the race of the lay; and behind this bar is a slot $b^7$ in which the picker stick C is moved. The bar $b^5$ has connected to its front side, by bolts $c^4$, an inclined finger $c^5$, which projects forward from the lay and constitutes a guide to determine the line of motion of the shuttle feeder $h$ when the latter moves from its inoperative to its operative position. The shuttle feeder $h$ consists of a flat plate having a slot $h'$, open at its end to enable the picker stick C to enter said slot and throw the spare shuttle $h^2$ from said shuttle feeder across the lay, said shuttle feeder being then in its operative position at the level of the race of the lay, and thus actually takes the place of the running shuttle box.

The plate of the shuttle feeder is mounted upon a lever $h^3$, pivoted on a stud $h^4$ (see dotted lines, Fig. 1), held in the forked lower end of the block $n$, secured, by bolt $o$ to the rod D, carrying the running shuttle box. The block $n$ is shaped to enter, substantially fit, and be guided by grooves $h^5$ made in the rocker iron, which is attached by a set screw to one end of the rocker shaft on which are mounted the swords $A^3$ of the lay, the said block rising and falling in said grooves as the lever $c^3$ is turned in one or the other direction to lift or depress the rod D. The lever $h^3$, carrying the shuttle feeder, owing to its connection with the said block $n$, rises and falls in unison with the running shuttle box. The short arm $h^6$ of the lever $h^3$ has connected to it a spring $h^7$, the opposite end of the spring being fixed to the rod D, so that said spring normally acts to hold the shuttle feeder in its inoperative position, as shown in Fig. 1, and in such position a slotted or bifurcated part $h^8$ on the lever carrying said shuttle feeder embraces a stationary inclined guide or finger $h^9$, supported by a set screw $h^{11}$ on a suitable bracket $h^{10}$, fixed to the loom side, said finger extending toward the lay. The lever $h^3$ at the lower end of said bifurcated portion $h^8$ has a roller $h^{12}$ which, as the lever $h^3$ is lifted with the rod D by the lever $c^3$, acts against the under inclined side of the finger $h^9$ and causes said shuttle feeder to move toward the lay, the latter being supposed at that time to be advancing toward the breast beam, and as the said shuttle boxes are being lifted the said bifurcated portion passes from the finger $h^9$ upon the end of the inclined guide or finger $c^5$, extended from the lay, and the latter finger thereafter continues to act alone as a guide for the lever $h^3$ as the shuttle feeder comes into its operative position in a line vertical with relation to the line in which the running shuttle box moves on the lay, said finger $c^5$ also acting as a locking device to insure the movement in unison back and forth with the lay of the said shuttle feeder. These two fingers, when the lay is substantially forward, coincide, forming a sort of bridge, so that the lever $h^3$ may pass readily from one to the other.

When the filling fails and as the lay swings forward, the lever $c^3$ will have been moved far enough to start the lever $h^3$ on its upward movement, which causes the roller $h^{12}$, acting on the under side of the guide or finger $h^9$, to start said lever and the shuttle feeder toward the advancing lay, so that in said advancing movement the lever $c^3$, yet continuing its movement, causes the lever $h^3$ to pass from the guide or finger $h^9$ onto the guide or finger $c^5$, and by the time that the lay completes this forward movement the running shuttle box will have been lifted substantially into its inoperative position and the shuttle feeder will have come nearly into its operative position at the level of the race of the lay, and by the time that the second back stroke of the lay is completed the running box will have been put into inoperative position and the shuttle feeder fully into its operative position. On this second backward stroke of the lay the shuttle in the running shuttle box will be thrown from the open rear side of said running shuttle box over the top of the wall $c$ into the receptacle $c^3$, and as the lay reaches the proper position in its second back stroke for the shuttle to be picked, the picker stick C acts in the slot $h'$ of the shuttle feeder and throws the spare shuttle from the shuttle feeder onto the race of the lay. During the next or third forward stroke of the lay, both shuttle boxes are emptied, and at this time the shuttle box lever $c^3$ is again moved, this time, however, to lower the running shuttle box and the shuttle feeder and moving the bifurcated portion of the lever $h^3$ from the finger $c^5$ onto the finger $h^9$, leaving the shuttle feeder in its inoperative position, so that by the time that the lay arrives at the end of its third back stroke the said running shuttle box will receive the shuttle just thrown from the shuttle feeder at the previous back stroke of the lay.

The bottom plate of the shuttle feeder has at each of its outer edges next the operator and near its opposite ends, two uprights $t$. The spring $g$ is connected at one end to the upright $t$, the other upright acting as a stop against which the free end of the




spring is normally pressed, the top of said spring at its end being overlapped by a short lip extending backwardly from the said upright.

To the rear side of the lay is connected a stand provided with an ear $u$ carrying a stud which enters the hollow hub $v$ of lever $w$, a part of the face of which is normally kept in the path of movement of the picker stick by a spring $x$ said lever acting as a picker stick check. The position of said lever as regards the line of motion of the picker stick is controlled by a stop $z$.

This shuttle changer is also provided with a stop motion, the object being to provide means to prevent the lay from banging against the stopping bunters when the spare shuttle fails to be supplied from the shuttle feeder mechanism.

Fig. 3 shows in its end view a portion of this stop motion, and Fig. 4 gives a rear view of another portion of it.

A bracket 4 is secured to the inside of the breast beam 2 at the shuttle feeder mechanism end of the loom. On a stud in the upper part of said bracket 4 is pivotally supported an angle lever 5, to one end of which is pivotally connected the upper end of lever 6. A spring 7, extending in a recess in the lever 6 and in the angle lever 5, acts to move the lever 6 outwardly, as shown in Fig. 4. The lower end of the lever 6 extends through a slot or opening in an extension 4′ on the bracket 4, and has an offset 6′ with a lip 6″ thereon, which in case the lever 6 is not held in its inward position by the end of the shuttle engaging therewith, will extend over an extension 1′ on the plate 1 of the shuttle feeder mechanism, as shown in Fig. 4. The other arm of the angle lever 5 has pivotally connected thereto one end of rod 8, its other end being pivotally connected to one arm of angle lever 9, pivoted on stud 10. The other arm of said angle lever 9 rests at 11′ on the end of the knock off lever 11, fast on rock shaft 12, as mounted in bearings at the front of the breast beam, and the upwardly extending arm 11″ of the knock off lever 11 engages the shipper lever 13, as shown in Fig. 3, to unlock said lever 13 and stop the loom in the ordinary way.

When there is a shuttle on the plate 1 of the shuttle feeder mechanism the lever 6 is engaged by said shuttle and held in such a position that the movement of the shuttle feeder plate 1 to supply a new shuttle to the loom in case of the failure of the filling in the running shuttle will not engage said lever 6 to operate the knock off lever and shipper lever and stop the loom; but in case there is no shuttle on the plate 1 of the shuttle feeder mechanism then the lever 6 will be moved outwardly by the spring 7, as shown in Fig. 4, so that the lip 6″ thereon will extend over and be engaged by the extension 1′ on the plate 1 of the shuttle feeder mechanism and the movement of this mechanism and the raising of the plate 1 will operate, through lever 6, angle lever 4, connector rod 8 and angle lever 9, the knock off lever 11 and shipper lever 13 to stop the loom. In the upward movement of the plate 1 it moves toward the lay, so that the extension 1′ thereon will be disengaged from the lip 6″ on the lever 6.

In order to prevent the operation of the shuttle changing mechanism when the operator is placing a new shuttle on the plate 1 of the shuttle feeder mechanism and thus protect the operator from injury by the raising of the plate 1, a supplemental mechanism is provided, consisting of a lever 14, pivoted at 15 on the bracket 4 and having at its lower end a pin 15′, which engages the inclined end 16′ of a lever 16, pivotally supported on a pin 17, extending in the lower slotted end of the bracket 4. The opposite end of the lever 16 is provided with a lip 16″ which extends under an arm 18, secured on the end of a rod which is connected to the elbow lever as forming a part of the shuttle changing mechanism described in the first part of this article. The end of the arm 18 extends through a slot in the lower end of another arm 3, fast on the rock shaft 12, and a lip on said arm 18 engages with the arm 3 when the arm 18 is in its lower position. When the arm 18 is raised by the movement of the lever 16, caused by the movement to the left of the lever 14 by the operator, as shown in Fig. 4, the lip on arm 18 will not be engaged by the slotted end of the arm 3, fast on the rock shaft 12, so that the rocking of said shaft by the filling fork motion and the movement of the elbow lever (previously referred to) will not move the arm 18 to put into operation the shuttle changing mechanism. After a shuttle has been placed on the plate 1 of the shuttle feeder mechanism the lever 14 is moved to the right to allow the end of the lever 16 to drop down, and with it the arm 18, into position ready to be engaged and operated by the arm 3 on the rock shaft 12.

This shuttle changer is also provided with a signal attachment for indicating to the weaver that a fresh shuttle is needed on the shuttle feeder.

Fig. 5 is a front view of this signal attachment, showing the spare shuttle holder plate of the shuttle feeder in its raised position.

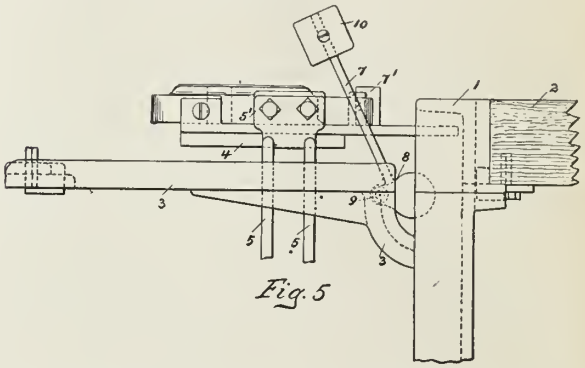


Fig. 5

1 indicates a portion of the loom frame, 2 the breast beam, 3 a stand secured to the loom frame and 4 the spare shuttle holder plate bolted to the upper ends 5 of the lever which operates the shuttle feeder. An arm 7 has a weight 8 at one end and is pivotally mounted on a stud 9 as bolted to the stand 3. The opposite end of this arm 7 carries the signal 10. This arrangement permits the arm 7 to move, in a vertical plane from the horizontal (lowered) to a raised position, the weight 8 acting to hold the arm 7 in its lowered position when pushed down by the weaver, but when the projection 7′ on the arm 7 is engaged by the upper edge 5′ of the two ends 5 of the lever previously referred to, said arm 7 is raised by the upper and forward movement of the shuttle holder plate 4 on the transfer of a shuttle to the lay, the weight holding said arm in raised position until again pushed down by the weaver.

This shuttle changer is also provided with means whereby when the filling is nearly exhausted, it will operate to automatically supply another shuttle. The device is applied to the other side from the shuttle changing mechanism.

Fig. 6 shows a top view of the device as applied to the filling fork end of the loom.

The shuttle $a$ is provided with a pivot pin $b$ on which is mounted a feeler $c$ having a rounded end $d$ to engage the filling on the bobbin, a spring $e$ holding the same in place. The bobbin $f$ is provided with two recessed portions $g$ $h$. The filling in the recess $g$ at each pick of the loom will be so reduced at the point where the end $d$ of the feeler $c$ engages it that said feeler $c$ will be moved sufficiently to act effectively and engage with its end $i$, the actuating device $j$ at the proper time, the filling in the supplemental recess $h$ after the exhaustion of the filling in the recess $g$ and the operation of the feeler $c$ providing sufficient filling for a number of picks of the shuttle and thus prevent the bobbin from being exhausted before it is changed on the other end of the loom. When the bobbin $f$ has the desired quantity of filling, the end $i$ of the feeler $c$ will be out of engagement with the actuating device $j$; but when the filling on the bobbin has been exhausted to a predetermined point the end $i$ of the feeler $c$ will be in position to engage the actuating device $j$ to operate the same and automatically operate the shuttle supplying mechanism on the other end of the loom. The movement of the actuating device $j$ at the proper time

through intermediate connections, acts to raise the filling to a position where it cannot be engaged by the filling fork, thereby leaving the filling fork and its slide free for backward movement and change the

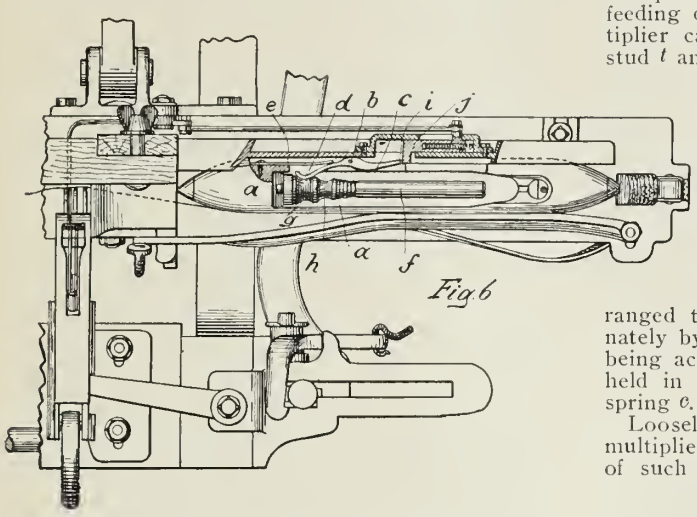


Fig. 6

shuttle. This latter mechanism can also be applied to looms of ordinary construction and in which instance said mechanism acts as a stop motion upon exhaust of filling. *(Crompton and Knowles Loom Works.)*

## SHUTTLE BOX OPERATING MECHANISM FOR CROMPTON LOOMS.

This mechanism has for its object to provide means for automatically throwing out of operation the pattern surface feed and the multiplier feed on breakage of a pick, or when for any reason it is desired to operate the loom for a considerable period of time with the same shuttle, as when weaving the body of a blanket or other equivalent large body of fabric.

The new mechanism is particularly adapted for use in connection with box mechanisms wherein the pattern surface and multiplier feeds are actuated alternately—as, for instance, when connected with a common actuator and facing in opposite directions—so that one feed will operate on movement of the actuator in one direction, the other being operated on the return movement of the actuator. In mechanisms where two feeds are thus alternately operated, if when the loom is stopped, one feed be thrown out of action and the other not thrown out of action, the latter feed, when the loom is again started, will operate to impart a feeding movement to its mechanism before the first one can pick up or recover the feed which it lost when the loom was stopped, and therefore the said latter feed will overrun the first feed, and thereby throw the two out of proper timing one with relation to the other. To obviate this, when either of the threads is thrown out of action, the other should likewise be thrown out and held out of action until the first has picked up or recovered the feed which it lost in order that in the subsequent operation of the loom the two threads may follow each other in proper order as if no breakage had occurred. This feature is accomplished in the new mechanism.

Fig. 1, in vertical section and partial elevation, shows a sufficient portion of a loom embodying the new mechanism to enable the latter to be understood; and Fig. 2 an enlarged detail showing a rear side view of some of the parts in different positions.

A indicates the frame, C the breast beam, D the cam shaft, *a* the filling fork and its slide, *b* the hooked finger, *d* the stop rod, *k* its arm, *l* the shaft on which the pattern surface *c* is mounted, *q* is the ratchet, *f* its feed pawl which in the present instance constitutes the feeding device for the pattern surface, *r* is the multiplier cam or surface, *s* its ratchet mounted on a stud *t* and actuated by the pawl *u*, which in the present instance constitutes the multiplier feed device, and with the pattern surface feed device *f* are secured to and alternately moved to operate their respective feed mechanisms or surfaces by the actuator B, and the pawl lifters *v* and *z*.

The movable lifter *z* is controlled by the pattern surface *e* which also controls the box mechanism and the pattern feed lifter *v* is controlled by the multiplier surface *r*, the pattern and multiplier feeds being arranged to operate in opposite directions and alternately by the vibrations of the actuator B, the latter being actuated by the rod *g*, connected to a lever *h* held in contact with a cam *i* on the cam shaft by spring *e*.

Loosely mounted upon the stud *t* carrying the multiplier pattern surface is a disengaging device *m*, of such shape and construction, that when moved

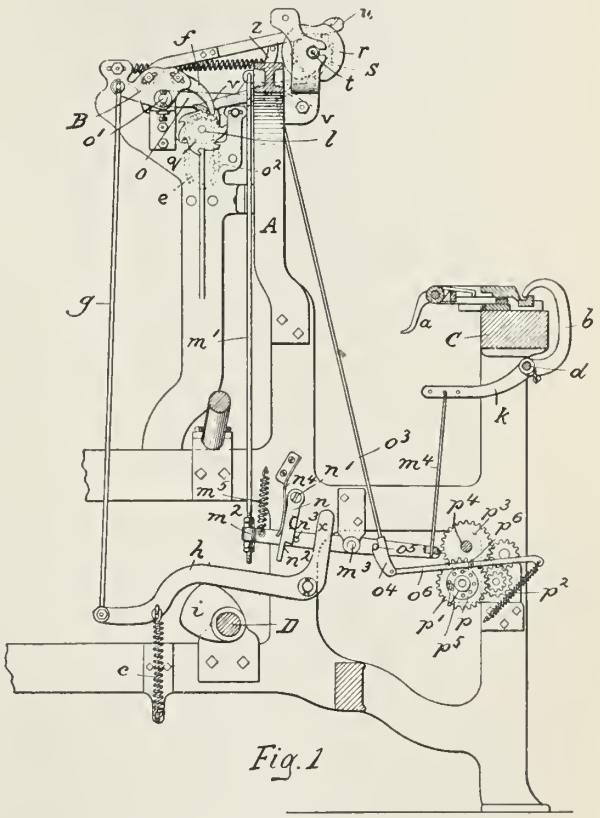


Fig. 1

from its full line position Fig. 2, it will act to separate the multiplier feed device *u* and the pattern feed lifter *v* to move the one from possible engagement with the teeth of its ratchet *s* and move the other to remove the pattern feed device *f* from engagement with the teeth of its ratchet *q*. This disengaging device is provided with a radially extended arm, which is connected at its end by a rod *m'* with a lever $m^2$, (see Fig. 1)

fulcrumed on the frame at $m^3$, and connected at the opposite side its fulcrum by a link $m^4$ with the arm $k$ of the stop rod $d$ of the automatic filling stop motion for the loom.

When during the operation of the loom the filling slide carrying the filling fork $a$ is moved to the right, Fig. 1, to stop the loom because of the breakage or undue slackening of a pick, the hooked finger $b$ will be moved to rotate the stop rod $d$ and raise its arm $k$ to thereby operate through the link $m^4$ the lever $m^2$ and rod $m'$ to depress the arm referred to and the disengaging device $m$ and turn the latter in the direction of the arrow Fig. 2, to throw out of action both feed devices.

Means are provided to hold the feed devices disengaged or out of action until such time as they can be again put into action in the same order in which they were operating when stopped, such means being a dog $n$, pivoted to the frame at $n'$ and notched at $n^2$ to coöperate with a pin $n^3$ on the lever $m^2$, referred to, a spring $n^4$ acting to press said dog toward the pin.

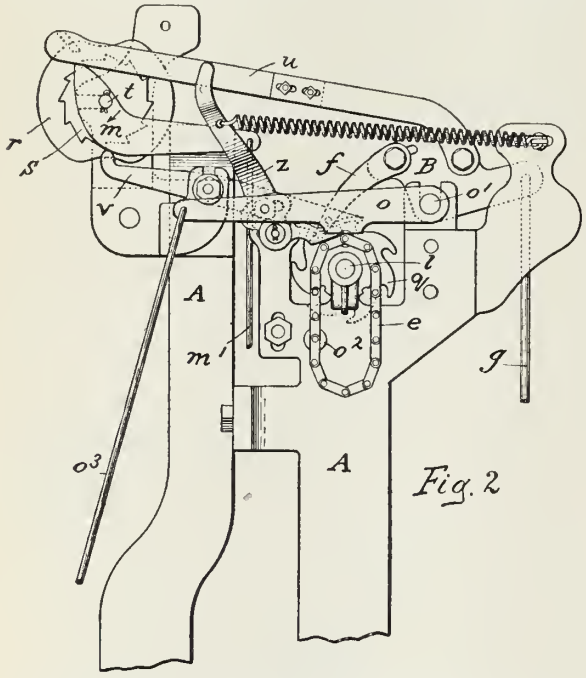



Fig. 2

When the lever $m^2$ is moved, as described, to throw out of action the multiplier and pattern feeds the pin $n^3$ is carried below the notch $n^2$, permitting the spring $n^4$ to move the dog over the pin to hold the lever $m^2$ in its new position with the feed devices out of action, the parts remaining thus held out of action until the proper time, the second pick after that at which the loom was stopped, when the dog $n$ is disengaged to permit the lever $m^2$ under the action of its spring $m^5$ to move to again introduce the feed devices into action.

For the release of the dog $n$, referred to, there is provided the lever $h$ with an upwardly extended arm $x$, which as the cam $i$ drops said lever, will engage the dog $n$ and move it to release the lever $m^2$ and at this time if the lever $b$ and filling fork and stick have been restored to their normal position for the operation of the loom, the lever $m^2$ will by means of spring $m^5$ assume its normal position.

For throwing out of action both the pattern and multiplier feeds for considerable periods of time when it is desired to weave large bodies of fabric without change of shuttles, lever $o$ is provided (see Fig. 2,) fulcrumed upon the frame at $o'$ and adapted to be raised at the proper time by a roller or rollers $o^2$ in or on the pattern surface $c$, said lever being provided with a depending rod $o^3$, carrying at its lower end a notched or hooked head $o^4$, adapted to lie normally beneath a pin $o^5$ on the lever $m^2$, referred to.

The roller $o^2$ is introduced into the pattern surface at such point that when in the weaving of the fabric the body portion is reached, it will pass under and lift the lever $o$, and thereby through its hooked head $o^4$ and the pin $o^5$ turn the lever $m^2$ into its position described for throwing out of action both the multiplier and pattern feeds, said lever being at once locked in this new position by the dog $n$, referred to. To release the lever $m^2$ when thus held by the hooked head $o^4$ at the proper time, said head is connected with a bar $o^6$ resting upon and held in contact with a cylindrical shoulder $p$ on and rotatable with a toothed wheel $p'$, (see Fig. 1,) a spring $p^2$ being employed to hold the bar $o^6$ in operative contact with the said shoulder.

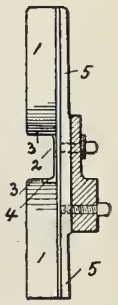
The wheel $p'$ is connected by gearing with a gear $p^3$ in and rotatable with the take up roller or shaft $p^4$, said wheel $p'$ being also provided adjustably with a finger $p^5$, adapted to engage a roller or other stud $p^6$, on the bar $o^6$, so that at the proper time in the rotation of the wheel $p'$, which time is determined by the gearing between it and the take up roller, the said finger $p^5$ will engage the stud $p^6$ and move the bar $o^6$ and the hooked head $o^4$ to the right Fig 1, to release the pin $o^5$ and the lever $m^2$ and permit the latter immediately thereafter to be released by the lever $h$ to throw into action both feeds for the finishing of the fabric. (*Crompton and Knowles Loom Works.*)

## SHUTTLE BOX GUIDE FOR CROMPTON LOOMS.

The object is to provide a guide for the inner ends of the shuttle boxes, and which guide is provided with a flange both above and below the level of the raceway to hold the shuttle in position.

The illustration is a vertical section of this shuttle box guide which is secured to the lay by bolts and comprises a plate for guiding the shuttle and a flange projecting outwardly in front of the inner ends of the shuttle boxes to cover the tips of any of the shuttles carried in the boxes.

The flange 1 has a central opening 2 therein on a level with the raceway and curved surfaces 3 at said opening. Through the opening 2 the ingoing or outgoing shuttle passes into or out of one of the cells of the shuttle boxes in line with the raceway. and the curved portions 3 act to force the shuttle into the box as the shuttle boxes are raised or lowered, and the flange 1, above and below the level of the raceway, acts to hold the shuttle in the box when the box is above or below the level of the raceway.




At the lower portion of the opening 2 a horizontal shelf 4 is provided upon the inner surface of the guide plate 5, and on a level with the raceway. This projection 4 is not wide enough to allow of the point of the shuttle engaging therewith as the shuttle boxes are raised or lowered, but serves to form a support for the inner edge of the shuttle to travel on as it is picked from or into the cell of the shuttle boxes.

By placing the guide of the inner end of the shuttle boxes on the shuttle box frame and back of the

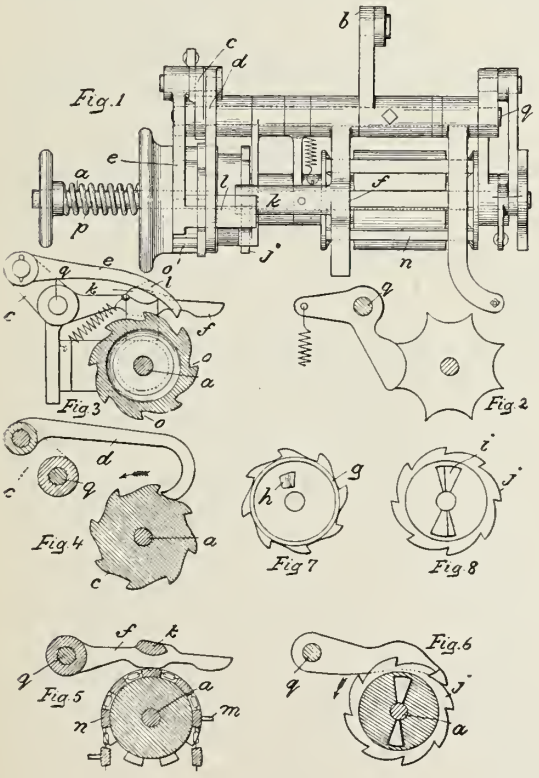
face of the reed, with a lip or flange extending outward from this position far enough to just cover the tip of the shuttles, the whole front of the guide is left clear and free from any danger of entanglement of the several threads of filling extending from the different cells of the shuttle box to the selvage of the cloth. *(Crompton and Knowles Loom Works.)*

## THE MASON SHUTTLE BOX MULTIPLYING MECHANISM.

The feature of the mechanism consists in such a construction that the regular feed motion of the filling chain and its multiplying motion cannot be in or out of operation simultaneously, the withdrawal of one compelling the operation of the other, thus guarding against mispicks.

Fig. 1 is a top or plan view, slightly broken away, of the multiplying and chain mechanisms of the loom, and Figs. 2 to 8 are details of it. Both motions are operated through the same system of connections and are on the same shaft.

*a* is a shaft carrying the chain cylinder and the forward and reverse ratchets for the same. *b* is an arm that transmits a rocking motion to the sleeve on which is attached the arm *c* that operates the ratchet pawls *d* and *e* for the forward and reverse motion of the multiplier. Fig. 2 is a check wheel for holding chain cylinder in position after it is turned by one of the ratchet pawls *d*. Fig. 3 is a ratchet wheel and pawl for operating multiplier. Fig. 4 is the ratchet wheel




and pawl for transmitting a forward movement to the chain cylinder. Fig. 5 shows the chain cylinder in connection with the finger *f* through which the multiplier is operated. Fig. 6 is a check ratchet for holding chain cylinder in position while the multiplier is being thrown in operation. Fig. 7 is the ratchet wheel *g* having the **V**-shaped point *h* for engaging the slot *i* in the stationary ratchet wheel *j* shown in Fig. 8. Finger *f* and ratchet pawl *e* are each provided with an arm *k* and *l* respectively, running parallel with each other with their ends slightly overlapping.

When the chain is to be stopped for a certain number of picks a pin *m* is inserted at the proper point in one of the chain bars *n* which raises the finger *f* letting the arm *l* slide under arm *k*, thereby throwing the pawl *e* in engagement with the reverse ratchet wheel *o*. In the stationary ratchet wheel *j* there is slot *i*, one side of which is beveled with the **V**-shaped projection *h* fitting into it, and thus acting as a clutch when engaged. When the pawl *e* engages with the ratchet wheel *o* the ratchet wheels are moved laterally to the left by means of the incline on the clutch, thus being disengaged the chain cylinder remains at rest until clutch comes around again or it has reached another notch in the wheel *j*, when it is moved back in gear again by means of the spring *p* and is again moved forward by pawl *d*.

By varying the number and location of the multiplying pins *m* the frequency of operation of the multiplying mechanism may be varied, and by varying the number and location of the notches *i* in the ratchet wheel *j* the number of picks taking place while the chain is held stationary may also be varied.

In the device shown there are eight teeth on the ratchet wheel *o*, coöperating with the multiplying pawl, and there are two notches *i* arranged at diametrically opposite points. Therefore a movement equivalent to four teeth takes place between the two notches, and as there are two picks, an outward and a return, for each rocking movement of the shaft *q* it will be understood that eight picks will take place during the period of rest of the chain.

Should there be only one notch *i* in the wheel *j*, sixteen picks will take place during the period of rest of the chain, laying during that time picks of the same color or number.

The number of picks taking place during the period of rest of the chain may be also varied by varying the number of teeth on the ratchet wheel *o*. *(Mason Machine Works.)*

## THE WHITIN BOX MECHANISM.

This mechanism refers to two-box looms and has for its object the use of either box for any number of picks before calling the other box. The change of boxes is operated from the shedding motion, and as long as the lower box (being the raised position of boxes) is used it is securely locked in position, the use of the upper box putting the mechanism at rest and thus securing itself in proper position for any number of picks.

Fig. 1 is a side view of part of a loom provided with this box controlling mechanism. Fig. 2 is a side view of the friction clamp (shown enlarged compared to Fig. 1).

1 indicates the side frame of a loom, only so much of which being shown as is required to illustrate the box mechanism; 2 is a cam secured to the cam shaft and which is of such a shape that the dwell 3 holds the lever 5 stationary during more than half the revolution of the cam, and the throw 4-4 acts to operate the lever 5 forward and backward during less than half the revolution of the cam. The lever 5 is pivoted on stud $5^1$, projecting from the frame, and engages at one end with the groove in the cam 2, being provided at the opposite end with the segmental slot 6.

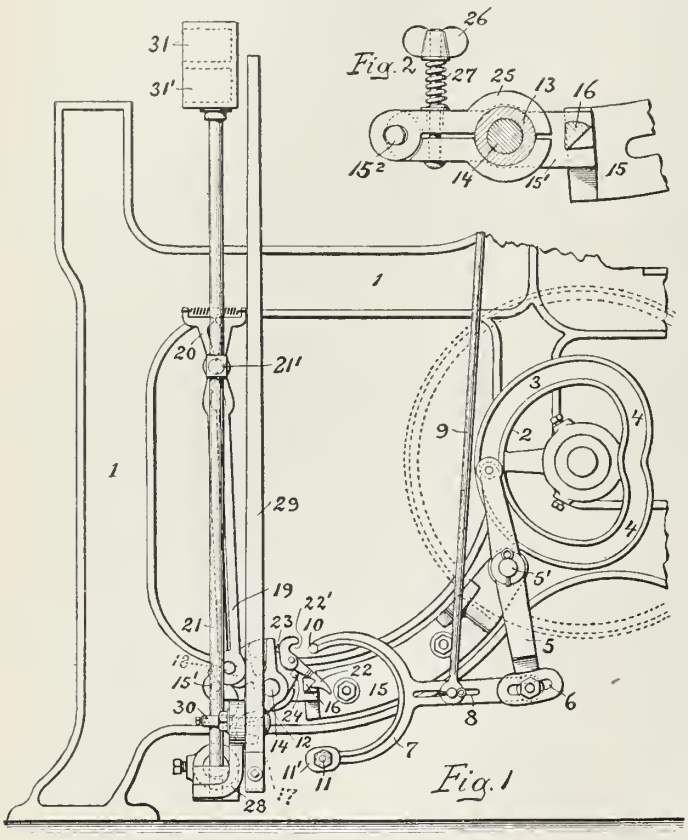
A fork 7 is pivotally secured in the slotted end of lever 5, being provided with the slot 8, and adjustably connected with the rod 9, which is connected to a lever controlled by the pattern chain. The fork 7 has at one of the bifurcated ends the knock off 10 and at the other end the knock off pin 11, adjustably secured in a slot in the end $11^1$ of the fork. The rocking plate 12 (shown in dotted lines) is provided with a sleeve 13 (see Fig. 2) and is journaled on the post 14. Bracket 15 is secured to the same post 14, also the post $5^1$, forming the pivotal support for the lever 5, and secures to the bracket 15 the locking post 16, so that when the bracket is secured to the frame 1 these parts are in their relative positions. The rocking plate 12 is provided with the hook 17 (shown in dotted lines) adapted to engage with the knock off pin 11 on one end of the fork 7 and with a slotted bracket 18, in which the lower end of the lifter rods 19 is supported and which are connected with the spring clamp 20, which engages with a stud $21^1$, secured to the box rod 21. The latch lever 22 is pivotally supported on the rocking plate 12 and is provided on one side of its pivotal support with a catch engaging with the locking post 16 and at the opposite side with a hook $22^1$, adapted to engage with the knock off 10 of the fork 7. A spiral spring 23 holds the latch lever 22 in the normal position against the stop 24.

To a pin $15^2$, projecting from the arm $15^1$ of the bracket 15, the clamp 25 is secured, bearing on the sleeve 13 of the rocking plate 12, the thumb nut 26 bearing on the coiled spring 27, regulating the frictional contact of the clamp on the sleeve 13. The lower end of the box rod 21 extends through a hole in the bracket 28, which forms the pivotal support of the picker stick 29. The collar 30 is secured to the box rod 21 by a set screw adjusted so as to sustain the box rod on the bracket 28 when the upper box is on a line with the shuttle race on the lay.

How the mechanism operates to lower boxes: Having the parts of the mechanism in positions as shown in Fig. 1, *i. e.*, in the positions they occupy when the boxes are in the raised position, with the lower box on a line with the shuttle race on the lay, the rotation of the cam 2 will maintain the same in this position until the roller on the upper end of the lever 5 passes from the dwell 3 of the cam and enters the operative part 4, when that end of the lever 5 is moved quickly backward and the lower end with the fork 7 is moved forward. The knock off 10 now encounters the hook on the upper end of the latch lever 22, disengages the catch from the locking post 16, thereby releasing the rocking plate 12, which turns on the post 14, and the box rod 21 with the boxes descends until the downward movement is arrested by the collar 30 coming in contact with the bracket 28.

Raising the boxes: When now the pattern chain raises the rod 9, and through it the fork 7, the knock off pin 11 engages with the hook 17 and turning the rocking plate 12 raises the box rod 21 and the boxes into the position shown in Fig. 1, the latch lever 22 automatically engaging with the lock post 16 and locking the boxes in the raised position.

Boxes at rest: The distance between the knock off end 10 and the knock off pin 11 is such that after the change in the position of the boxes is made the fork 7 may continue to vibrate without disturbing the boxes until a change is required by a projection on the pattern chain or a depression. 31 indicates the upper and $31^1$ the lower shuttle box. *(Whitin Machine Works.)*



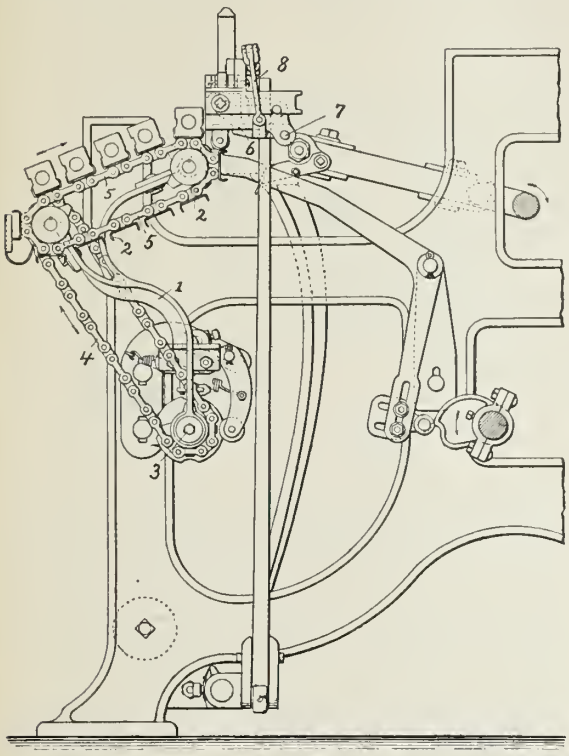

## THE THOMAS SHUTTLE CHANGING MECHANISM FOR COTTON LOOMS.

The new device has for its object that when the filling in the shuttle is exhausted or broken such shuttle is automatically discharged and replaced by another shuttle. The mechanism is so constructed that it works in connection with the filling stop motion. The filling motion and the shipper handle being disconnected so that when the filling runs out or breaks instead of the loom being stopped, the shuttle changing mechanism is thrown into action, thus discharging the shuttle, the filling of which may have broken or run out, and replacing it with a fresh shuttle.

The mechanism is so constructed that the fresh shuttles are supplied from the front side of the box and discharged through the bottom, the swell of the shuttle being placed on top so as not to interfere with the changing mechanism.

The illustration is a side view of part of a loom, showing the shuttle carrier 1 and a part of the operative mechanism, the parts inside of the loom frame being omitted. 5 is the endless chain for carrying the shuttles and which is provided with springing clasps 2 for holding the shuttles in position. Shaft 3 drives sprocket chain 4 which drives chain 5. 6 is a

gate which forms the bottom of the shuttle box and works on a pivot 7, from which it can be tilted down-




ward when a shuttle is to be removed, the chain 5 being at the same time moved forward, bringing another shuttle in position to be caught by the gate 6 on its upward stroke and placing it in the shuttle box. Thus as soon as an empty shuttle has reached its destination on the changing side it is thrown out and replaced by a fresh shuttle on the forward stroke of the lay.

To insure the quick removal of the empty shuttle from the box, the gate 6 is connected by means of a link 8, with a deflector in the top of the shuttle box (and over the shuttle) which moves downward in connection with the gate and forces the shuttle out, making the action quicker than if it was left to gravitation alone. *(Whitin Machine Works.)*

## BIRCHALL'S SHUTTLE BOX OPERATING MECHANISM.

The object of this mechanism is to provide the loom with means for controlling the boxes from a dobby, Jacquard mechanism, multiplier, etc., whereby the boxes can be operated in regular or irregular intervals, according to the design of fabric to be woven.

Fig. 1 is a side elevation of a loom provided with this shuttle box operating mechanism, only those parts of the loom being shown which are necessary to fully illustrate the nature of the improvement; Fig. 2 is a detail rear elevation of a portion of Fig. 1, and Fig. 3 an enlarged detail view of a certain box lever controlling and operating mechanism.

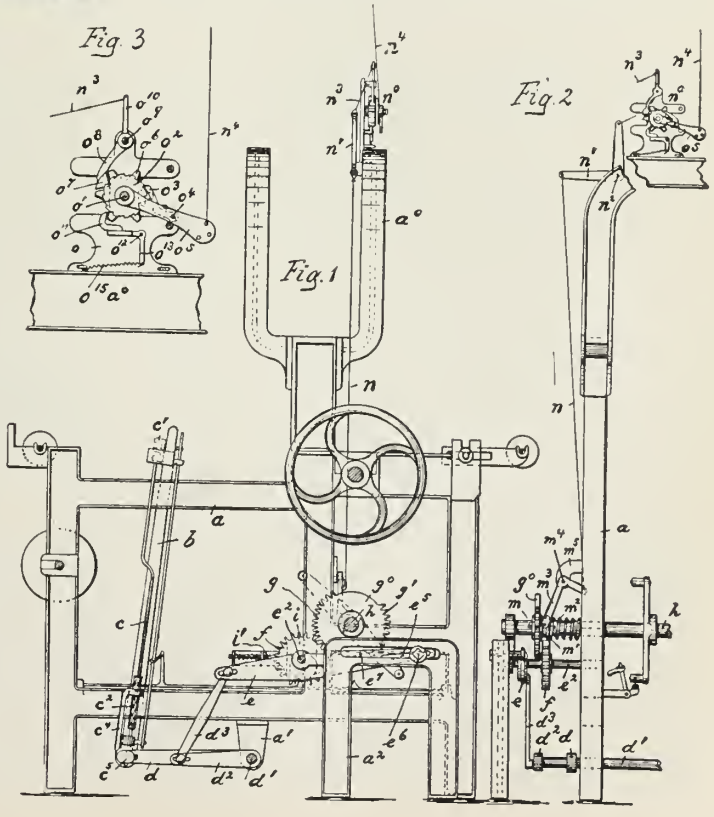
$a$, represents the loom frame, and $b$ the fulcrumed lay sword. The rod $c$, which carries at its upper end the shuttle boxes (two compartment boxes) $c'$, is guided at its lower portion in a tube $c^2$, secured to the fulcrumed bracket $c^4$. To the lower portion of the rod $c$, is pivotally secured, as at $c^5$, one end of the arm $d$, the other end of which is securely mounted on a shaft $d'$, extending across the loom and connected with the shuttle box rod on the other side of said loom.

On the shaft $d'$, which has its bearings in the downwardly projecting brackets $a'$ of the loom frame $a$, is secured one end of the arm $d^2$, the other end of which is adjustably and pivotally connected, through link $d^3$, with a forwardly projecting end of the lever $e$, eccentrically mounted on the shaft $e^2$, and carrying a gear wheel $f$, which is stripped of two teeth diametrically opposite. The rear end of the lever $e$, is provided with an elongated slot $e^5$, penetrated by a pin $e^6$, adjustably arranged in the elongated horizontal slot $e^7$ of the auxiliary frame $a^2$.

On the picker shaft $h$ is arranged a gear wheel $g^\circ$, connected with said shaft by a key and feather arrangement $m$, by means of which latter the gear wheel $g^\circ$ can be laterally moved or shifted on the shaft $h$.

The gear wheel $g^\circ$, is provided with two segmental sections $g$ and $g'$, also with a grooved collar $m'$ surrounding the shaft $h$, and held in normal position by means of the spiral spring $m^2$, is clearly shown in Fig. 2.

The grooved collar $m'$ is engaged by pins arranged in the forked end of the angle lever $m^3$, fulcrumed, as at $m^4$, to a bracket or projection $m^5$ of the loom frame $a$. The other end of said angle lever is con-



nected, through a cord or wire $n$, with angle lever $n'$, which latter is fulcrumed, as at $n^2$, to the top or connecting brace $a^\circ$ of the loom frame.

In the bracket or frame $o$, projecting from the cross brace $a^\circ$, is arranged a shaft $o'$, on which are securely mounted the ratchet wheel $o^2$, and the star wheel $o^6$. The notches in the star wheel $o^6$, are adapted to be engaged by a block $o^7$, carried by the pawl $o^8$ fulcrumed as at $o^9$, and provided with an arm $o^{10}$, connected through a cord or wire $n^3$ with the angle lever $n'$.

The ratchet wheel $o^2$, is adapted to be engaged by a pawl $o^3$, pivotally secured, as at $o^4$, to the link $o^5$, loosely mounted with one end on the shaft $o'$, and having its other end connected through a cord or wire $n^4$ with a dobby, jacquard mechanism, multiplier, etc.

The star wheel $o^6$, is held in position by the hooked end $o^{11}$ of an angle lever $o^{13}$, which is fulcrumed, as at $o^{12}$, to the frame $o$ and is controlled by a spiral spring $o^{15}$.

The gear wheel $g^\circ$ is normally held out of engagement with the gear wheel $f$, and whenever a shuttle is called for, the said gear wheel $g^\circ$ is shifted on the shaft $h$ into the plane of the gear wheel $f$, and thus into engagement with the same, whereby the latter is operated.

For this purpose the cord or wire $n^4$, is pulled upward by the mechanism before referred to, thus causing the pawl $o^3$ to rotate the ratchet wheel $o^2$, and through the shaft $o'$, the star wheel $o^6$.

The block $o^7$ is forced out of its respective notch of said star wheel, causing the cord or wire $n^3$ to operate the angle lever $n'$, and the latter, through the cord or wire $n$, the angle lever $m^3$. When the block $o^7$ again engages the next following notch of the star wheel $o^6$, the pull on the cords or wires $n^3$ and $n$ is released and the gear wheel $g^\circ$, by action of the spiral spring $m^2$, is returned to its normal position. *(Robert Atherton, Paterson, N. J.)*

## FILLING CHANGING MECHANISM FOR NORTHROP LOOMS.

In Northrop looms a filling carrier is automatically transferred from a rotatable feeder or hopper into the shuttle, upon failure or exhaustion of the filling therein, such transfer being accomplished by a pusher or transferrer which engages the filling carrier while it is held in the feeder or hopper. The change is made very rapidly, and the metallic transferrer acts with such force in practice that very often the yarn is cut or damaged. This is not apparent when using a bobbin, as the wood thereof will yield sufficiently to prevent damage to the thread, but with the metal cop spindle as very largely used for a filling carrier, metal is opposed to metal, with sometimes only one layer of thread between, and the thread will be cut or pinched.

In the new mechanism the extremity of the transferrer is provided with a yielding cushion, whereby the impact of the transferrer will not damage any portion of thread between it and the tip of the spindle of the cop or filling carrier.

Fig 1 is an end elevation and partial section, representing a sufficient portion of a filling changing mechanism with the new motion applied thereto. Fig. 2 is a side elevation of the transferrer in engagement with a filling carrier.

$a$ indicates one member of the rotatable feeder, $b$ is the transferrer mounted on stud $c$, and having the downturned end $d$ and a finger $e$. $f$ is the lifting spring, $g$ the arm, and $h$ the tip supporting or directing device. The bent end $i$ of the finger $e$ is flattened, transversely slotted, and recessed at its extremity to receive a rubber cushion $k$. The main portion of the cushion is shaped to enter the recess previously referred to, and it is extended and reduced in thickness to enter a transverse slot in the end of the finger $e$ of

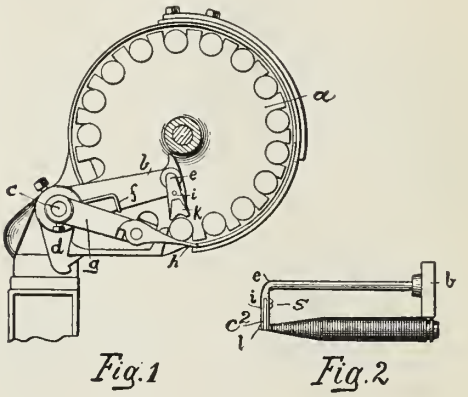



Fig.1 Fig.2

the transferrer, the reduced portion also forming side ribs $c^2$, which, entering the slot in the end of finger $e$ adjacent the recess, serve to prevent lateral displacement of the cushion. Screw $s$ secures the cushion in place in the finger $e$ and a concavity is made in the outer end of the cushion, to engage the end of the spindle $l$ of the filling carrier, as shown in Fig. 2. Should a portion of the filling thread be caught between the spindle of the filling carrier and the cushion of the transferrer, the yielding character of the cushion will prevent damage to such portion of the thread. *(Draper Co.)*

## NORTHROP'S SHUTTLE BOX.

This shuttle box has for its object to provide means for stopping the shuttle, *i. e.* holding the shuttle more centrally and besides cushioned, to prevent shock as it is brought to rest, a bridge or guard for the picker being also provided to prevent the latter from rising or jumping when starting.

As mentioned above, this construction provides a definite position for the shuttle in the shuttle box.

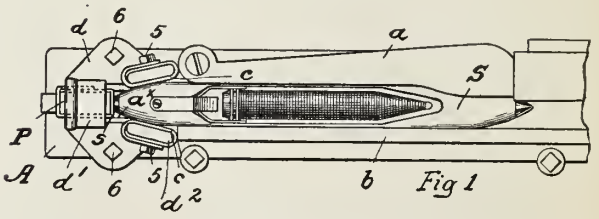



Fig 1

which is of importance particularly in looms provided with automatic filling supplying mechanisms.

Fig. 1 is a top or plan view of a portion of a lay with its shuttle box and a shuttle therein; and Fig. 2 is a perspective view of the casting detached, which provides supports for the shuttle stops, the picker bridge forming a part thereof.

A indicates the lay, which is slotted longitudinally at $a^x$ for the picker stick and has at its end a shuttle box comprising a back piece $a$ and front guide $b$. P is the picker and S the shuttle, the latter being shown at rest in the shuttle box.

At the outer end of the shuttle box there is secured

to the loom a casting comprising a two part base $d$, connected at the outer end by a raised bridge or guard $d'$ crossing the longitudinal passage $d^x$, extended through the base plate and in which the picker stick swings. Each part of the base is shown as upturned at its inner end to form outwardly divergent supports or abutments $d^2$, symmetrically located relative to the longitudinal central line of the shuttle box. These abutments are located at the outer end of the shuttle box, as shown in Fig. 1, on opposite sides of the entrance to the passage $d^x$ in the base $d$ of the casting. The stops or abutments are provided with leather cushions $c$, held in place by bolts 5 Fig. 1, the abutments having bolt receiving holes 3. Bolts 6 secure the base $d$ to the lay. The inclined inner surfaces of the cushions $c$ conform substantially to the inclination of the shuttle just back of its point $s$, so that as the shuttle arrives fully in the box its inclined sides will meet the inclined faces of the cushions, taking up shock and centering the shuttle in the box. The picker plays freely beneath the guard $d'$, but any tendency of the picker to lift or jump in starting is prevented by the guard which also prevents the picker from engaging any threads on the hopper that may be slack enough to get in the way. *(Draper Co.)*

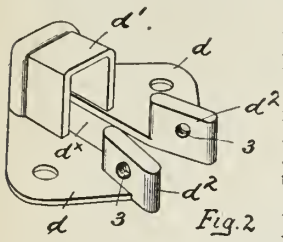


Fig. 2

## FITTZ AND REILLY'S DEVICE FOR POSITIONING SHUTTLES.

In many classes of looms it is necessary that the shuttle be properly positioned in the shuttle box—that is, that the shuttle shall occupy a certain definite position in the box—in order that the mechanism which depends for its proper operation upon the definite position of the shuttle in the shuttle box shall be perfectly free to act whether such mechanism comprises filling supplying means, some form of filling feeler or detector, or some other device.

The device has for its object the production of means for normally acting upon the shuttle to accurately position it in the shuttle box, said means being arranged and adapted to yield should the location of the shuttle relatively thereto preclude entirely the proper positioning of the shuttle—that is, if the shuttle is so far from its proper position that under such circumstances the filling supplying mechanism, filling feeler, or other device would not even tend to operate.

The illustration shows in plan view a portion of a lay and its shuttle box, with the new device applied thereto, the shuttle being shown as properly positioned.

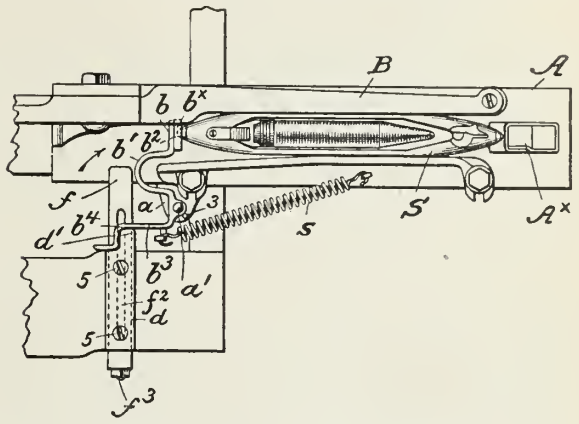
A indicates the lay, B the shuttle box, $A^x$ the picker-stick. A bracket $a$ is secured to the lay near the open end or mouth of the shuttle box, and on said bracket is fulcrumed at $a'$ the shuttle positioning device, shown as an arm $b$, bent outwardly at $b'$ and carrying on its extremity a pad $b^x$ having a depression $b^2$ therein to receive the metal point of the shuttle S. The arm has at the other side of the fulcrum $a'$ an extension $b^3$ of less width than the arm and bent at $b^4$, a spring $s$ normally retaining the positioning device in a position against a stop 3, leaving the mouth of the shuttle box open.

On the breast beam is rigidly secured a guide $d$, having its rear end extended beyond the breast beam to form a bunter $d'$, while a sliding bunter $f$ is mounted in the guide $d$, said bunter being longitudinally slotted at $f^2$ to receive the attaching bolts or screws 5 of the guide.

The outer end of the sliding bunter is downturned and has secured thereto a rod $f^3$ extended through an opening in the loom frame, said rod being surrounded between said part of the frame and its head with a spiral spring stronger than spring $s$.

The fixed bunter $d'$ is in the plane of the extension $b^3$ of the positioning device, while the sliding bunter $f$ is in the plane of the arm $b$ and in the path of the bent or cam portion $b'$ thereof, the bunter $f$ normally extending considerably beyond the fixed bunter $d'$.

If the shuttle has entered the shuttle box and has rebounded slightly or has not been thrown quite fully thereinto as the lay beats up, the bunter $f$ will engage the cam $b'$ and will swing the positioning device on its fulcrum in the direction of the arrow, the continued movement of the lay moving the part $b^4$ of the extension $b^3$ into the path of the fixed bunter $d'$. As the lay completes its forward movement the bunter $d'$ will complete the throw of the positioning device, the pad $b^x$ acting on the end of the shuttle and moving it into the shuttle box into a certain definite position, as clearly shown in the illustration. The recess $b^2$ receives the shuttle point and prevents direct engagement of the pad therewith.




So long as the shuttle is sufficiently within the box to permit of the positioning device acting upon it at or near its tip, the shuttle will be moved into proper position in the box. It sometimes happens, however, that the shuttle will be so far out of the box, that the positioning device cannot act to push it into position, and in such case the shuttle holds the positioning device from completing its movement. At such time the spring (not shown) of the sliding bunter $f$ will yield as the lay comes forward and the extension $b^3$ will not be moved far enough to bring it into the path of the fixed bunter $d'$, thus providing the necessary yield or give to the parts when the positioning device cannot be operated normally. *(Draper Co.)*

## DEVICE FOR GUIDING EJECTED BOBBINS FROM SHUTTLE IN NORTHROP LOOMS.

In Northrop looms mechanism is employed to automatically transfer from a suitable feeder a fresh filling carrier to the shuttle. The introduction of such fresh filling carrier acts upon the filling carrier then in the shuttle to eject it therefrom through a slot in the bottom of the shuttle box. Heretofore the ejected filling carrier has been guided from the shuttle to a suitable receptacle by a chute made movable to permit the free movement of the picker stick.

In the present device a chute of peculiar construction is provided which is rigidly secured to the lay, thereby obviating the necessary devices heretofore used to give sufficient movement to the chute to with-

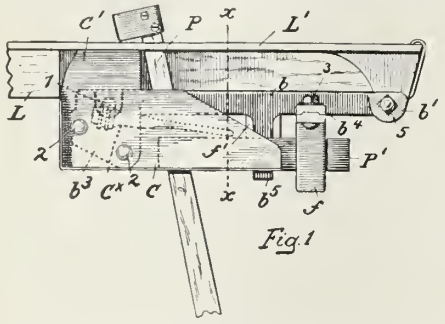


Fig. 1

draw it from the path of the picker stick, thus greatly simplifying the construction and reducing the number of parts of the loom.

Fig. 1, in front elevation, shows one end of the lay with the shuttle box omitted, with the new device applied to the lay. Fig. 2 is a transverse sectional view thereof on the line *x*-*x* Fig 1, the picker check strap being omitted. Fig. 3 is a right hand end view of the parts shown in Fig. 1, and Fig. 4 is a perspective view of the chute support detached.

L indicates the lay, L' the race plate which is longitudinally slotted at *a* for the picker stick P and for the ejection of a filling carrier from the shuttle; P' indicates the picker check strap. Beneath the slotted portion of the race plate the lay is cut away at $L^x$, and within the lower part thereof the chute support is secured, said support being a bar like casting *b*, slightly offset at its outer end at *b'* and at its inner end having a downwardly and outwardly inclined arm $b^2$. The support is attached to the lay by bolts 5 and 7, the latter passing through a boss *d* on a bracket $d^x$, secured to the back of the lay, said bolt 7 passing through the arm $b^2$, which is recessed at $b^3$, to receive the bolt head.

Referring to Fig. 2 it will be seen that there is a considerable distance between the casting *b* and the adjacent part of the lay beam, forming a slot for the picker stick, a leather cushion *m* being interposed between the casting and lay beam and through which the bolt 7 passes serving not only to position the inner end of the chute support *b*, but also to act as a cushion for the picker stick on its inward throw.

The bolt 5 holds the offset ear *b'* of the support firmly against a lug $L^2$, forming a part of the end of the race plate L'.

The guide chute C is attached to the arm $b^2$ of the chute support by bolts 2, and it is shaped at its inner end at C' to extend upward close to the slot *a* in the race plate, just beyond the end of the inward stroke of the picker stick, thereby avoiding and permitting the full stroke of the latter, while affording a convenient guide for the ejected filling carrier $C^x$, (see dotted lines Fig. 1) the extended outer end of the chute affording a large guide surface for the ejected filling carrier.

A projection $b^4$ extended frontward from the chute support *b* receives the picker check strap guide *f*, secured in place by a bolt 3, the loop like check strap P' being attached to a depending leg *f'* secured to the lay Fig. 3. The strap passes around the picker stick, and the front side of the strap is shown as passed behind the guide *f* and in front of a second guide shown as a depending leg $b^5$ on the casting *b*. These

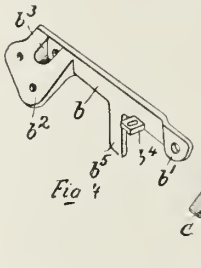


Fig 4

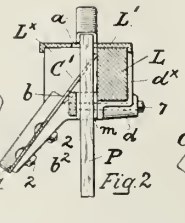


Fig. 2

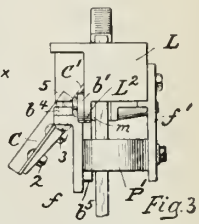


Fig. 3

guides act frictionally on the strap to retard its movement caused by the swing of the picker stick. *(Draper Co.)*

## IMPROVEMENT TO THE FILLING SUPPLYING MECHANISM FOR NORTHROP LOOMS.

In Northrop looms when transfer of filling has been effected, a strong spring acts to partially rotate the feeder until the filling carrier next to be removed engages a fixed stop, and as this spring is quite powerful the filling carrier receives a hammer blow and has to withstand the shock due to such stoppage of the feeder. To obviate this shock or strain on the filling carriers is the object of the new mechanism.

Fig. 1 is a transverse sectional view of a portion of a loom, taken inside of the filling supplying mechanism with the new device applied thereto. Fig. 2 is another transverse sectional view of the filling supplying mechanism.

When the spring as surrounding the stud *a* is

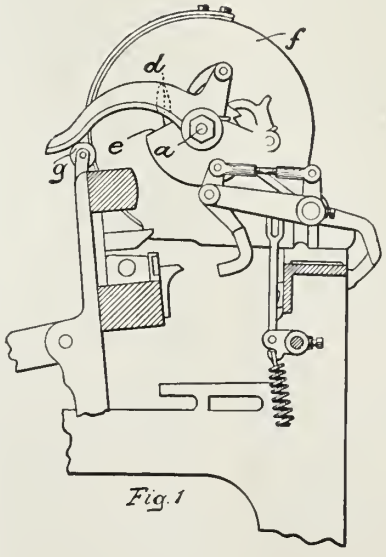


Fig. 1

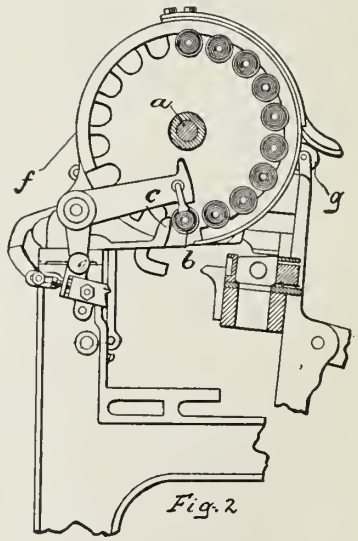


Fig. 2

wound and the parts are in the position shown in Fig. 2, let it be supposed that the filling carrier *b* is removed from the feeder by the transferrer when the

lay is forward. As the transferrer returns to normal position, thereafter, the feeder is free to be rotated by this strong spring as surrounding the stud *a*, until the next filling carrier of the series is brought into operative position; but to prevent the shock on such filling carrier due to its engagement with the stop *c* when the feeder is controlled by the spring, means are now provided independent of the filling carrier to limit the feeding action of the spring. This is effected by providing the pawl carrier with a lateral lug *d*, which in the descent of the pawl carrier engages a fixed abutment *e* on the stand *f* just as, or slightly before, the filling carrier reaches its position adjacent the stop *c*, so that the shock and hammer blow due to the sudden stoppage of the action of the spring is taken up by the lug *d* and the abutment *e*, and the momentum of the feeder brings the next filling carrier with but little force against the stop *c*. The outer end of the pawl carrier is then in position to be engaged and lifted by the roller *g* as the lay swings back, thereby winding the spring in readiness for the next feeding movement of the filling feeder, and as the pawl carrier is lifted the endmost filling carrier resting against the stop *c*, holds the feeder until the transferrer is again operated. When the spring is thus wound, the pawl by its engagement with the ratchet wheel maintains the pawl carrier lifted substantially in the position shown in Fig. 1.

By the construction thus described the filling carriers are relieved from shock when the feeding action of the operating spring is stopped, and the liability of breakage or displacement of the filling carriers is entirely obviated.

Should two or more filling carriers be absent from the feeder after transfer, the momentum of the feeder will be sufficient to bring the endmost filling carrier into position against the stop. The actuating means imparts initial feeding movement to the feeder, and the momentum of the latter completes the feeding movement. *(Draper Co.)*

## FILLING END HOLDER FOR NORTHROP LOOMS.

In Northrop looms, as is well known, the several filling carriers are mounted ready for use in a hopper and the filling ends are led to a fixed stud or other device, to which they are secured.

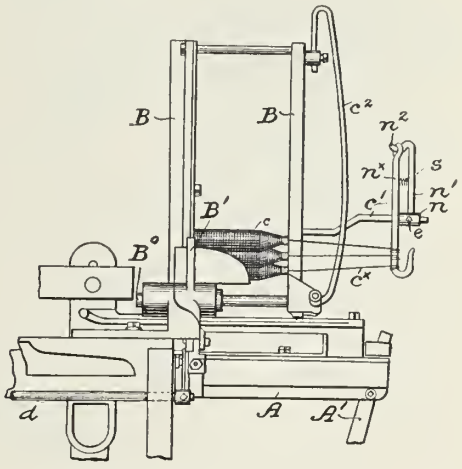
The sharp blow of the picker stick on the shuttle however exerts such a shock on the filling end of a fresh supply of filling just previously transferred from the hopper that it frequently breaks, the filling being unable to resist the sudden strain put upon its end as attached to the holding stud.

The new holder obviates this defect, by providing a filling end holder which is free to yield within certain limits when sudden strain is put upon the filling and to return to normal position when such strain is withdrawn.

The illustration represents in side elevation a circular hopper, having the new holder applied thereto, the latter being shown applied to filling supplying mechanism including a hopper or filling feeder, wherein the filling supplies *c* are held in a hopper B, comprising two upright members having guideways at their inner faces to retain in position a series of superposed filling carriers.

A represents the lay, A′ the picker stick, *d* the controlling or operating shaft, B′ the pusher or transferrer, having its fulcrum at B°, *c′* is the stud connected with the hopper, and $c^2$ the slack thread controller for preventing entanglement of the filling ends extending from the series of filling carriers in the hopper.

On the stud *c′* is mounted a hub or sleeve *n* (held in place by a set screw *e*) having an upwardly extended arm *n′*, provided with a lateral hooked ear $n^2$, upon which is pivotally mounted a depending filling end holder $n^x$, about which the filling ends $c^x$ are wound. When a filling carrier is transferred and the shuttle thrown across the lay by the adjacent picker stick, the depending holder $n^x$ swings in




toward the hopper B when strain is exerted on the filling end, thus obviating a sudden shock thereto and risk of breakage. After the transferred filling carrier has made one or more shots across the lay the filling end can be severed, and the end holder $n^x$ returns to normal position. This return of the end holder is assisted by a spring *s*, attached at its ends to the holder and its supporting arm *n′*.

The new holder is also applicable to those filling changing mechanisms wherein a fresh shuttle is transferred from the hopper, the desirability for a yielding filling end holder being as great in the one case as in the other. *(Draper Co.)*

## MASON'S FILLING END SUPPLYING DEVICE FOR NORTHROP LOOMS.

In the previous article we mentioned that the sharp blow of the picker on a shuttle having a fresh supply of filling, subjects the filling end to a very sudden strain or shock, with the result that said filling end frequently breaks before the filling begins to unwind from the end of its carrier.

To overcome this objection, means are provided in the new device for furnishing an additional length of filling end between the filling carrier and the point at which the filling end is held, so that as the shuttle leaves the box this extra length of filling will be given up and time afforded for the filling to unwind before the strain is exerted upon the filling end. By deflecting the filling end between the hopper and the holding device, the requisite slack or extra length of filling is provided, and to prevent tangling of the several slack portions each is normally held substantially taut by a detent, which latter releases the filling when subjected to a slight longitudinal strain.

Fig. 1 is a front elevation of a filling hopper with the filling end holder and a portion of the lay having the device for preventing the filling end from breaking attached thereto. Fig. 2 is a sectional detail showing the manner of securing the detents in place.

In the new device the filling ends are deflected when

let from the disk $a$ to the support $b$, as is clearly shown in Fig. 1, thus allowing an additional length or slack portion of filling, as $b^3$, which is taken up

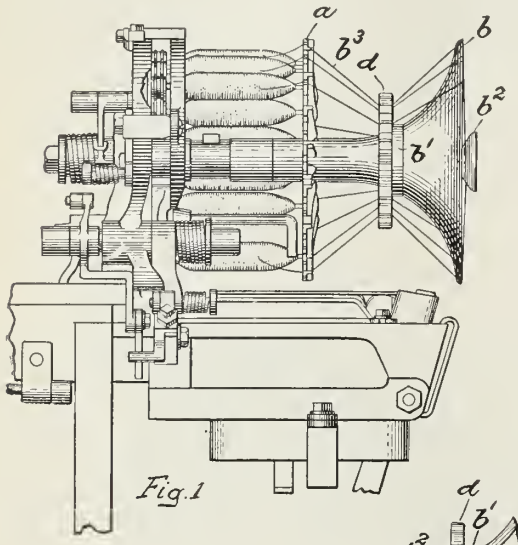



Fig. 1

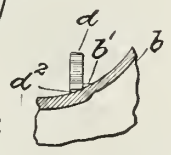



Fig. 2

as the shuttle leaves the shuttle box with its fresh supply of filling. In order to preserve this slack or extra portion of the filling end and to prevent the several ends from tangling, each filling end is normally engaged by a detent between the hopper and filling end support.

The detents $d$, as more clearly shown in Fig. 2, are made as yieldingly closed jaws of light spring metal, set into slots or saw cuts $d^2$ made in the enlarged portion or shoulder $b'$, forming a part of the support $b$, one of the detents being provided for each filling carrier in the hopper.

When the weaver loads the hopper, he draws off from the filling carrier a sufficient length of filling to enter between the jaws of the appropriate detent, and the loose end is then carried over the support $b$ and secured to the stud $b^2$, the deflection of the filling end thus effected providing sufficient slack or length to be given up when the filling is transferred and the shuttle thrown from the box. A very slight pull on the filling end will suffice to disengage it from the detent, the spring action of which is light and delicate.

So long as a filling carrier remains in the hopper the detent will retain its hold upon the filling end slack and prevent it from flying about or becoming displaced. *(Draper Co.)*

## SHUTTLE DETECTOR FOR NORTHROP LOOMS.

Fig. 1 is a partial end elevation of a loom with the new mechanism applied thereto, the outer or right hand end of the filling feeder being omitted. Fig. 2 is a sectional view of the loom, taken inside the filling feeder mechanism, the lay being shown as in its forward position, and Figs. 3 and 4 are illustrations of details.

A indicates the loom frame, B the breast beam, C the lay having the bottom of its shuttle box D Fig. 1, cut away below the self threading shuttle S. The filling feeder comprises connected plates, shaped to receive the ends of the filling carriers $b$, Fig. 1, and which plates are mounted to rotate on the stud $a$. $f$ indicates the stud having the transferrer $f'$, mounted thereon, and also the forked depending end $f^3$. The arm $f^0$ is also mounted onto stud $f$ and is provided with the tip supporting device $f^2$. The shaft $d'$ is adapted to be rotated by the movement of the filling fork in the absence of the filling.

An arm $d^2$ is secured to the rock shaft $d'$ and is connected to one end of a spring $d^3$, its other end being attached to the loom frame, and a link $d^4$ is jointed to the arm $d^2$, the upper end of the link having a longitudinal slot $d^5$ entered by a pin or stud $c^x$ on one of the arms $c'$ of a hub or sleeve $c$, mounted rotatably on the stud $f$, and having a second upturned arm $c^2$. To this arm one end of an adjustable link $e$ is pivotally connected, the other end of the link being jointed at $c'$ to a short upturned arm $k'$ of a hub $k$, mounted on the shaft or stud $a$, projecting from the stand $a'$, which supports the filling feeder as shown in Fig. 2.

A depending arm $k^2$, forms a part of the hub $k$, and is bent laterally at its lower end $k^3$, forming the shuttle feeler or detector and engages the shuttle if the latter is improperly positioned in the shuttle box. A rocker stud $m$, Fig. 4, having a disk like head $m'$, is mounted on the end $f^3$ of the transferrer, the spring $s$ normally tending to turn the stud in the direction of the arrow in Fig. 1, the stud $m$ having an arm $m^2$ with an ear $m^3$ on one side and a projection $m^4$ on the other side, while a notched dog $m^x$, adjustably held on the arm $m^2$, is adapted to be engaged by a bunter E on the lay when a filling carrier is to be transferred to the shuttle.

A third outwardly extended and downturned arm $c^3$ on the hub $c$ has attached to its extremity a down turned finger $n$, which extends down over the lug $m^4$

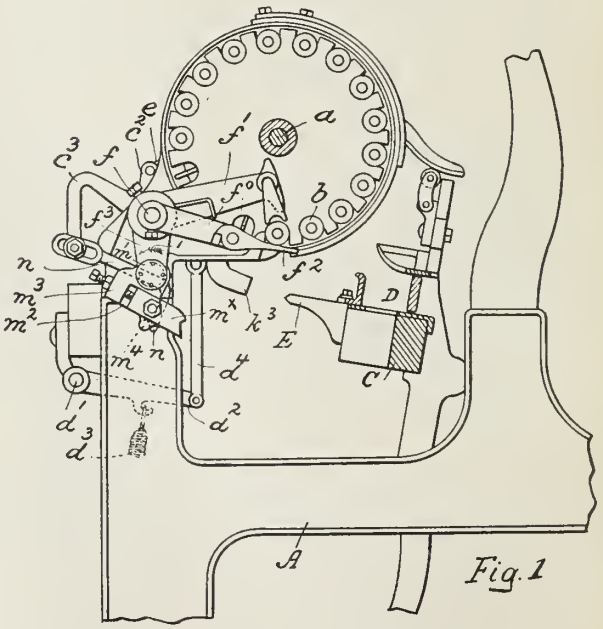
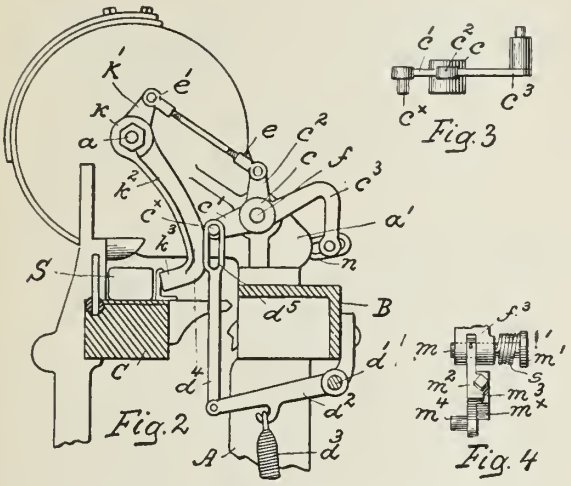



Fig. 1

on the arm $m^2$, (see Fig. 1), and at times controls the latter.

When the loom is running properly, the dog $m^x$ is out of the path of the bunter E, and the rock shaft $d'$ holds the link $d^4$ down, and the arm $c^3$ is

thereby elevated, with the finger $n$ toward the front of the loom to thereby act on the lug $m^4$ and maintain the dog $m^x$ in inoperative position, the finger $n$ thus forming a detent for the dog. When the filling fails, however, the rock shaft $d'$ will be turned, elevating










link $d^4$ and permitting the hub $c$ and its arms to turn on the stud $f$ so that the spring $s$ immediately turns the stud $m$ to throw the dog $m^x$ into position to be engaged by the bunter E, when the lay beats up. The movement of the arm $m^2$ by its spring causes the lug $m^4$ to move the finger $n$ inward, depressing the arm $c^3$ and rocking the hub $c$ to operate through the link $e$ and move the shuttle feeler or detector $k^2$ across the inner end of the shuttle box, so that if the shuttle is properly positioned the bunter will engage the dog $m^x$ and operate the transferrer $f'$.

Should the shuttle be improperly positioned, it will meet the end $k^3$ of the feeler as the lay beats up and will swing it on its fulcrum, moving the arm $k'$ in the opposite direction, and through link $e$ and arm $c^2$ the hub $c$ will be turned to swing the arm $c^3$ outwardly, thereby causing the finger $n$ to engage the lug $m^4$ and rock the arm $m^2$ oppositely to the arrow 1 Fig. 1, depressing the dog $m^x$ out of the path of the bunter.

Inasmuch as the transferrer is only operated when the dog is engaged by the bunter, the transferrer will not be operated to transfer a filling carrier to the shuttle when the latter is improperly positioned.

The slot $d^5$ in the link $d^4$ permits the described rocking movement of the hub $c$ when the link is elevated and the shuttle is improperly positioned. *(Draper Co.)*

## IMPROVED SHUTTLE DETECTOR FOR NORTHROP LOOMS.

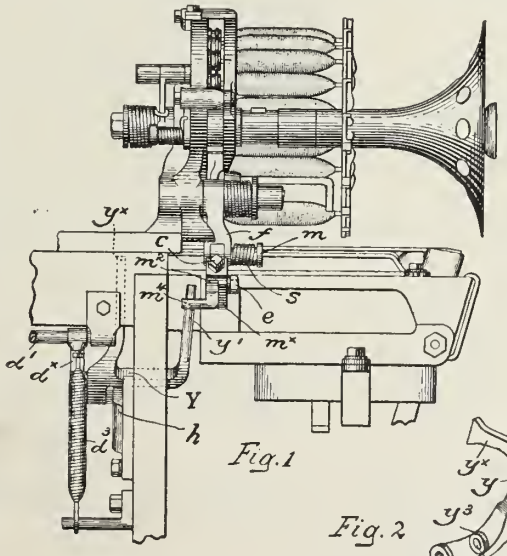
The connections between the shuttle feeler and the actuating means for the filling supplying mechanism in a Northrop loom, as explained in the preceding article, are complicated, involving a number of parts, which trouble to overcome is the object of the new construction, securing at the same time a more direct action of the means for preventing the transfer of filling when the shuttle is improperly positioned in the shuttle box.

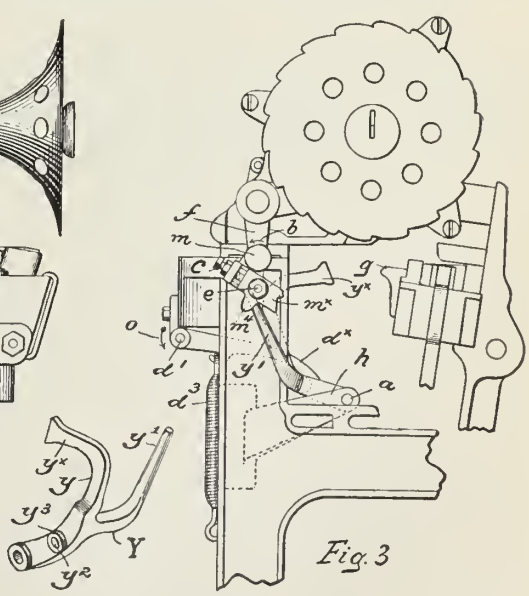
Fig. 1 is a front elevation of portion of a loom, which explains the action of the new device, as shown applied thereto, in connection with the filling supplying mechanism. Fig. 2 is a perspective view of the shuttle feeler detached. Fig. 3 is a right hand side elevation of the apparatus shown in Fig. 1.

The end $f$ of the transferrer has mounted thereon a headed rocker stud $m$, surrounded by a spring $s$ Fig. 1, one end of which is attached to the head of the stud and the other end to the part $f$, the spring normally tending to turn the stud in the direction of the arrow $b$ Fig. 3, said stud having secured thereto an arm $m^2$, provided with a laterally extended projection or lug $m^4$, a notched dog $m^x$ being adjustably secured to the arm $m^2$ by set screws $c$ and $c$, said dog when moved into operative position being engaged by a bunter $g$ on the lay when a change of filling is to be effected.

In order to prevent filling change if the shuttle is improperly positioned in the shuttle box, the movement of the dog into operative position is controlled by a shuttle feeler, the controlling connection between it and the dog being of a very simple character.

The loom frame is provided with a bracket $h$, on which is pivoted at $a$ a yoke Y Fig. 2, one of the upturned arms $y$ of the yoke, being bent at its upper end to form a shuttle feeler $y^x$, the other arm $y^1$ of the yoke being upturned and of sufficient length to directly engage the lug $m^4$ on the dog supporting arm $m^2$. The yoke is provided with a lateral stud $y^2$, on which is mounted an antifriction roll $y^3$, (see Fig.




2), said roll being normally engaged by a detent finger $d^x$, fast on the rock shaft $d^1$ and normally maintained in the position by a strong spring $d^3$, at-

tached at its ends to the detent finger and to the frame.

When the shuttle feeler and its rigidly attached arm $y'$ are in normal position, the roll $y^3$ will be between the fulcrum $a$ of the yoke and the lug $m^4$ of the dog support, and the spring $d^3$, being stronger than the spring $s$, the dog will be maintained in inoperative position so long as the detent finger $d^x$ operatively engages the yoke.

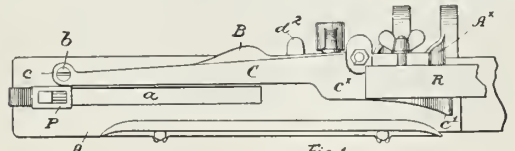
Upon failure of the filling, however, the rock shaft $d'$ is turned in the direction of the arrow $o$ Fig. 3, and against the stress of the spring $d^3$, so that the detent finger $d^x$ releases the yoke and permits the shuttle feeler to move toward the lay to detect the position of the shuttle, such detecting movement being effected through the action of the spring $s$, and if the shuttle is properly positioned in the shuttle box, the feeler is permitted to complete its full detecting movement, so that the controlling arm $y'$ is moved sufficiently to permit the swinging of the dog $m^x$ into position to be engaged by the bunter $y$ as the lay comes forward. Such engagement of the dog and bunter effecting the change of filling.

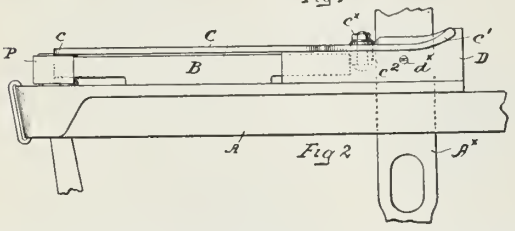
Should the shuttle be improperly positioned, however, it will be engaged by the feeler, so that the latter can complete its detecting movement, and the controlling arm $y'$ thus operates to prevent the movement of the dog into operative position. *(Draper Co.)*

## BACK BOX PLATE FOR COTTON LOOMS.

The object is the production of a back box plate whereby the cost of production is reduced and the construction simplified.

Heretofore the side and cover of the back box plate have been made as a single piece, and the finishing



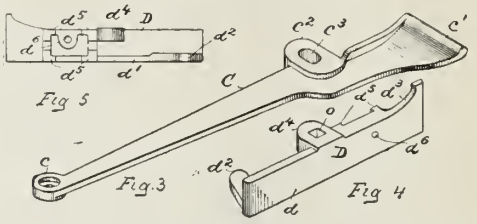




of the front and rear faces of the side and the under face of the cover have been attended by considerable difficulty and expense, owing to the peculiar shape of the casting. In the new construction the side and cover are made separately and thereafter rigidly connected, the separation of the parts enabling the finishing of the faces to be readily and cheaply effected and providing for the ready replacement of either part when necessary.

Fig. 1 is a top or plan view of one end of a lay beam provided with the new back box plate. Fig. 2 is a front elevation thereof. Figs. 3 and 4 are perspective views, slightly enlarged compared to Figs. 1 and 2, of the box plate, cover and side, respectively, and Fig. 5 is a rear side elevation of the box plate side.

A indicates the lay, being longitudinally slotted at $a$ for the picker stick P. $A^x$ is the lay sword, R the hand rail and B the back binder, mounted to rock on the vertical pivot stud $b$.

The back box plate cover member C is a casting tapering toward its outer end and provided with a socketed eye $c$ for the pivot stud $b$, the inner end of the cover being broadened and slightly upturned, as at $c'$. An ear on projection $c^2$ projects rearwardly




from the plate, provided with a slightly elongated hole $c^3$ for the reception of the fastening bolt $c^x$, by which the cover and side of the box plate are connected.

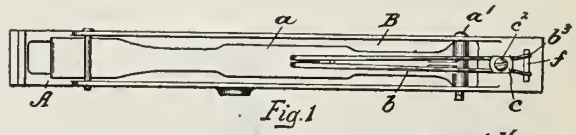
The separate side member D of the box plate (shown separately in Figs. 4 and 5) is cast with a plane front face $d$ and a longitudinal ledge or flange $d'$ on its rear face, at its lower edge, said flange at the outer end being extended to form a foot or support $d^2$ for the back binder B to move over.

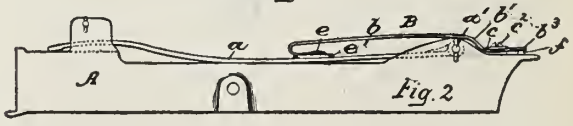
The top of the side member D is curved at its inner end, as at $d^3$, to fit the under side of the cover C at its inner end, and a rearwardly extended ear $d^4$ on the side member extends beneath the ear $c^2$ of the cover when the members are assembled, said ear $d^4$ having a hole $o$ to receive the fastening bolt $c^x$. As best shown in Figs. 4 and 5, the top of the ear $d^4$ is made slightly higher than the depth of the casting D, adjacent thereto, to bear against the under side of the ear $c^2$ on the cover C, thus requiring only the opposed faces of said ears to be accurately finished. The side member D is ribbed on the back adjacent the ear $d^4$ to present, as herein shown, four bearings $d^5$, which abut against the face of the lay sword, a hole $d^6$ in the side member receiving the top bolt $d^x$ Fig. 2, by which it is secured to the lay sword.

When finishing the parts, the front face $d$ of the side member D is readily machined to present a true plane and polished surface, and the bearings $d^5$ back of the member D can also be as readily finished, and by reason of the fact that the cover member C is a separate piece its under face can also be easily and cheaply finished and polished. *(Draper Co.)*

## GORDON'S SHUTTLE BINDER SPRING.

In looms the binder which acts on the shuttle in the box is generally acted upon by a strong flat spring. These springs are comparatively heavy, and when applied to a shifting shuttle box their aggre-




gate weight acts considerably to the momentum of the lay, and further, these springs have frequently to be bent or changed in shape to adapt them to their work, so that they shall exert the desired pressure

on the binder, again they frequently break transversely because of the strain put on them in use.

To overcome these objections is the purpose of the new binder spring, it consisting of wire bent to present two arms lying side by side, said spring thus being very light and practically indestructible.

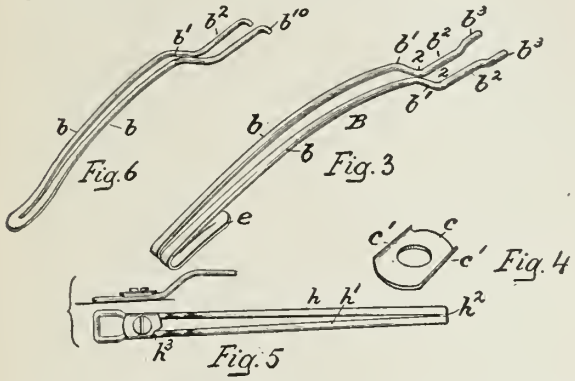



Fig. 1 shows part of a shuttle box presenting one cell with a binder acted upon by the new spring. Fig. 2 is a view of the shuttle box turned over from its position Fig. 1. Fig. 3 shows the spring enlarged and detached. Fig. 4 shows the spring holder detached, and Figs. 5 and 6 show modified forms of springs.

The metallic shuttle box frame A is a one shell box, having its binder $a$ pivoted at $a'$. Instead of the usual flat steel spring bent and having a hole for the reception of a screw to confine the spring to the shuttle box, the new spring B is employed, it being composed of wire which will stand up to its work and wear longer without breaking than the flat steel spring.

This new spring is made by bending a piece of strong spring tempered wire to leave two corresponding branches $b$, somewhat inclined with relation each to the other, the said branches having each an inclined portion $b'$ and neck portions $b^2$, the neck portions being adapted to be embraced by a holder $c$, shown as a washer, it having lips $c'$ at two of its edges, so that when said holder is set onto the neck portions of the spring and a screw $c^2$ (see Figs. 1 and 2) is put through the holder and between the two necks, the said neck portions will be firmly seated and held on the shuttle box.

The branches in Figs. 1 to 3 have bent tail pieces $b^3$ of such shape as to prevent the ends of the branches from being drawn from between the lips $c'$.

Figs. 1 to 3 show the best form for shaping the end of the wire spring which contacts with the binder, and in which the free end of the wire spring is shown bent inwardly, as at $e$, to make a spring head which acts against a lump $e'$ on the binder, or between projections. The tail pieces of the branches rest on a projection $f$ from the shuttle box, so that by turning the screw $c^2$ in, more or less, the pressure of the free end of the spring on the binder is increased or adjusted to the desired amount.

The double branched spring acts more readily and favorably than could a one branch spring, and the double branched spring is far more durable than any plate spring.

In Fig. 5 is shown a modification wherein the two branches $h$ $h'$ have their ends soldered together at $h^2$, making the head different from that shown in Fig. 3, the holder $c$ resting on the neck portion $h^3$.

In Fig. 6 another modification is shown and wherein the wire comprising the acting end or head of the spring is flattened to act on the binder, the free extremities of the two branches having the two necks $b^2$ and pointed ends $b^{10}$ to enter holes in the shuttle box.

In the illustrations a metallic shuttle box is shown, but the improved spring may be used on any plain loom having one shuttle box at the end of the lay, the spring acting on its usual binder. The wire used may be either round or of any other shape in cross section. *(Crompton and Knowles Loom Works.)*

## TALKS' SHUTTLE BINDER.

The objects of this binder are, more sensitive action, superior adjustment and increased lasting qualities.

Fig. 1 is a front view of a portion of the lay and its adjacent parts, showing the shuttle boxes provided with binders; Fig. 2 is a top plan view of the shuttle box detached and of the binder in position therein; Fig. 3 is a view in elevation of the binder; and Fig. 4 a longitudinal sectional view of the latter.

$a$ indicates the lay of the loom, in the extended frame $c$ of which are arranged the shuttle boxes $b$, supported by the box rod $c$ and guided in the brackets $d$ and the end portion of the lay. To the outer end of each shuttle box is secured an elongated (bent or curved) spring $f$, the free end of which bears upon the rear portion of the binder. Said binder consists of an elongated metallic frame $g$, having midway thereof a longitudinal opening $h$ formed in it, extending for about two thirds of its length. One end of the body of the binder is penetrated by a vertical orifice $i$, whereby the binder is pivotally secured to the shuttle box by means of a bolt $j$, extending through lugs $k$ near the outer end of said shuttle box, while the other end of said binder is flattened and adapted to be disposed against a projection $m$ on the inner end of the shuttle box and between said projection and a removable pin $n$, extending through lugs $o$, projecting from extensions $m$ on the shuttle box. The opening $h$ in the body of the binder is spanned by a bridge piece $p$, having a depression $q$ in its outer face for

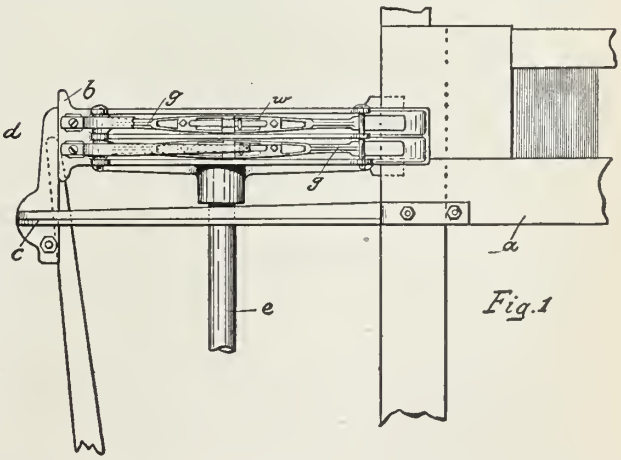


Fig. 1

the reception of the free end of the spring $f$, which bears against said bridge and holds the binder in operative position.

In the opening $h$ formed in said body is an elongated shoe $r$, having the shape of, but being a little smaller than said opening. This shoe is formed of hard wood, and is backed by a metallic plate $s$, secured to said shoe by screws $t$ and has its free ends curved and embedded in the ends of the shoe.

*u* designates a staple which penetrates the plate *s* and whose ends are formed into heads *v*. *w* indicates an elastic strip forming a spring which pro-

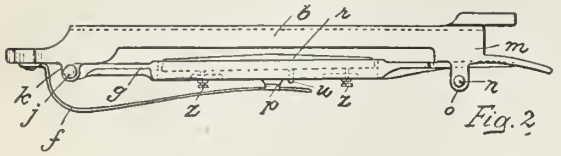


Fig. 2.

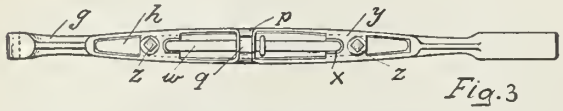


Fig. 3

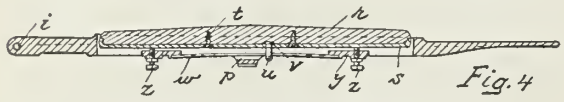


Fig. 4

jects through the staple *u* and whose ends rest in recesses *x*, provided in the outer faces of webs *y*, situated one on each side of the bridge *p*.

*z* indicates a pair of adjusting screws which penetrate and work in the webs *y* and by the manipulation of which adjustment of the shoe in the body portion of the binder is effected. It must be remembered that the acting or bearing face of the shoe is not plane, but bulges somewhat.

This construction of a binder renders it possible not only to adjust the acting or bearing portion thereof, technically called the "shoe," so that the binder may be made to act at its best upon the shuttles in stopping the same, but also permits of a removal of said shoe for the purpose of reversing the same, as well as for substituting for it a new one. The removal of the shoe from the body portion of the binder is effected by simply displacing the ends of the spring *w* from their recesses *x* and withdrawing said spring longitudinally, the adjusting screws *z* having been first manipulated so as to reduce the tension on said spring. *(Henry Talks and Wm. Melvin, Paterson, N. J.)*

## TALKS' IMPROVED SHUTTLE BINDER.

This binder is an improved construction over the one explained in the previous article.

Figure 1 is a top plan view of a shuttle box detached from the loom and of the improved binder in position

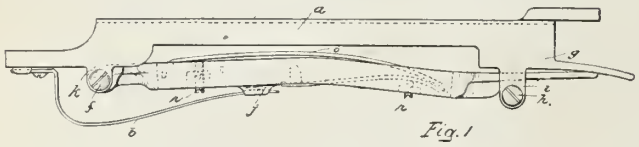


Fig. 1

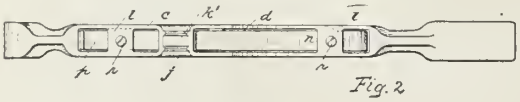


Fig. 2

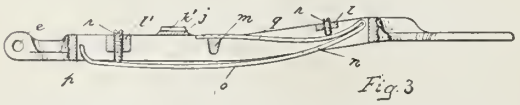


Fig. 3

therein. Fig. 2 is a view in elevation of the improved binder and Fig. 3 is a longitudinal sectional view of the latter.

*a* indicates a shuttle box to the outer end of which is secured an elongated bent or curved spring *b*, the free end of which bears on the rear portion of the binder, which consists of an elongated metallic frame *c*, having a longitudinal opening *d*, formed in it substantially midway thereof and extending for about two thirds of its length.

One end of the body of the binder is penetrated by a vertical orifice *e*, whereby the binder is pivotally secured to the shuttle box by means of a bolt *f*, extending through lugs *k* near the outer end of said shuttle box, whereas the other end of said binder is flattened and disposed between projection *g* on the inner end of the shuttle box and a removable pin *h*, extending through lugs *i*.

The opening *d* in the body of the binder is spanned by a bridge piece *j*, having a longitudinal depression *k'* in its outer face for the reception of the spring *b*, which bears against said bridge piece and holds the binder in operative position. Near each end of the opening *d* is formed a web or rib *l l'*, which connects the two sides of the body of the binder. A similar web or rib *m* also connects the two sides of the binder and is situated in proximity to the bridge piece *j* and between the latter and the web *l*.

*n* is a metallic spring whose body portion has a slight swell or bend therein, as at *o*, and one of whose ends *p* is turned or bent upwardly and the other of whose end *q* is bent back upon the body portion of said spring, extending to about the middle thereof. Said spring is arranged in the binder under the webs *l l'*, with the free extremity of its rebent portion extending over the rib *m*. Set screws *r* are arranged in each of the webs *l l'*, and by them said spring is rendered adjustable. The swelled or curved body portion of the spring normally projects beyond the body of the binder and alone affords a bearing surface for the shuttle. *(Henry Talks and Wm. Melvin, Paterson, N. J.)*

## THE KNOWLES SWIVEL LOOM.

In this swivel loom the swivel shuttle rail carrying the swivel shuttles is operated from below, doing away with any overhead mechanism, employing the regular Knowles harness shedding or shuttle box operating mechanism for operating the swivel shuttles.

Fig. 1 is a side elevation of a portion of a loom having the swivel mechanism added, being a view taken looking in the direction of arrow *a* Fig. 3. Fig. 2 is a detached plan view of the lever for moving the shuttle rail horizontally and of the lever for moving it vertically, shown in Fig. 1. Fig. 3 is a front elevation of a portion of a loom having the swivel mechanism added, being a view taken looking in the direction of arrow *b* Fig. 1. Fig. 4 is an enlarged sectional view of the swivel shuttle rail, taken at the line *b* Fig. 3, looking in the direction of arrow *c* same figure. Fig. 5 is an enlarged front view of the central portion of the swivel shuttle rail shown in Fig. 3, with a portion of the rail broken away.

Examining Fig. 3 we find in the construction a sliding pick mechanism employed for controlling the action of the fly shuttle mechanism, *i. e.*, mechanism is provided to move the picking rolls 12 out of or into engagement with the picking shoe 11 by means of sliding rods 14 and 15, the movement of which is controlled through intervening mechanism from the Jacquard. As stated before the Knowles harness or shuttle box operating mechanisms are employed for giving longitudinal motion to the swivel shuttle rail

and to the swivel shuttles independently of any movement of the shuttle boxes, according to the indications of the Jacquard, the cords leading to which are connected with the vibrator levers of said shedding or box operating mechanism.

The swivel shuttle rail 27 carries three sets of longitudinally moving racks 28 for communicating motion through sets of pinions 29, supported in downwardly extending blocks or pieces 27', to three sets of swivel shuttles 30. (See Figs. 4 and 5.)

The swivel shuttle rail 27 has at each end two guide rods 31, 31' extending out therefrom, of which the upper guide rod 31 extends the full length of the rail. Both guide rods 31, 31' are supported and have a sliding motion in castings 32, 32' located at each end of the swivel rail. Each casting 32 and 32' is supported on an upright and vertically moving rod 33 by an adjustable collar 34. A sleeve or collar 35, secured on the front end of arm 36, secured to the lay sword 4 (see Fig. 1), acts as a guide for the upper ends of the upright rods 33. Rod 37 extends out from one end of the swivel rail 27 and is secured thereto at its inner end, and at its outer end has secured thereon a rack bar 38, with which meshes a rack segment 39, pivotally supported on the arm 32'' of the casting 32'. (See Fig. 3.) The rack segment 39 has the outwardly extending arm 39', having a longitudinal slot in its end, to which is pivotally connected the upper end of a vertically moving rod 40.

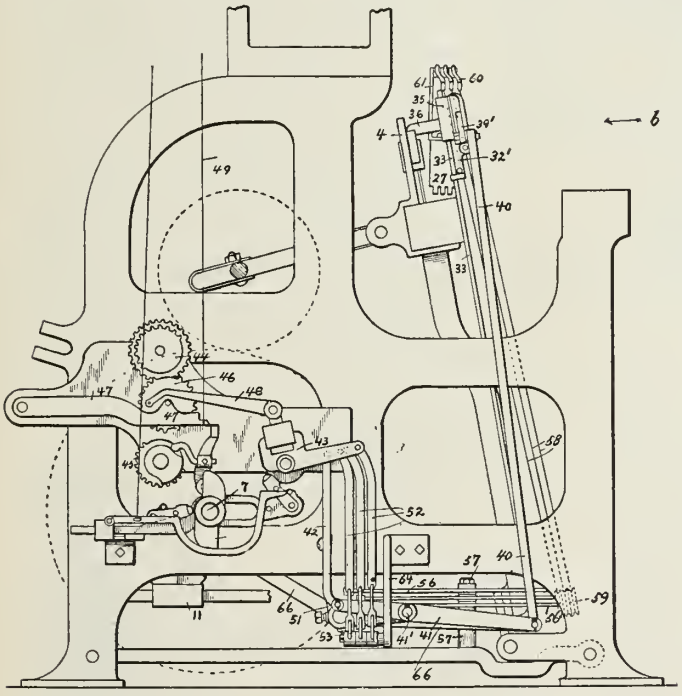



Fig. 1

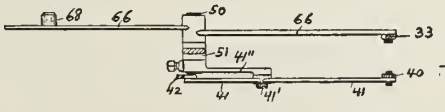



Fig. 2

The lower end of said rod 40 is pivotally attached to one end of a lever 41, which is pivotally supported between its ends on a stud 41' in the end of the arm 41'', fast on the shaft 50, mounted in the lower end of the bracket 51. (See Fig. 2.) The other end of the lever 41 is connected by a link or connector 42 with the angle lever 43 of the shedding or box operating mechanism, consisting of the upper and lower partial gears 44 and 45 and vibrator gear 46, carried on the vibrator lever 47 and connected by the connecting arm 48 to the lever 43. A cord 49, in this instance, leads from the vibrator lever 47 to the Jacquard mechanism (not shown) to raise or lower the vibrator lever carrying the vibrator gear and control the movement of the lever 43.

Through lever 43, connector 42, lever 41, upright rod or connector 40, rack segment 39 and rack bar 38 longitudinal motion is communicated to the swivel rail at the proper time.

In addition to the longitudinal motion of the swivel shuttle rail, each set of shuttles has an independent longitudinal motion from one block 27' to an adjoining block and back through the system of pinions 29 and sliding racks 28. Each rack 28 is operated independently from the shedding or box operating mechanism through a connector 52, attached to one of the several angle levers 43, and to one of the several angle levers 53, pivoted on a stand 54, attached to the loom side and a rod or connector 55, attached at its inner end to one of several centrally pivoted levers 56, mounted to swing in a horizontal plane on a stud 57. To the opposite end of each lever 56 is secured a cord 58 passing over a pulley 59 and extending up and attached to the outer end of an angle lever 60, which is pivotally supported on a stand 61, secured upon the top of the swivel rail 27. The opposite end of the angle lever 60 is connected by a link 62 with the sliding plate 63, which is guided and held in position upon the upper side of the swivel shuttle rail 27 by guides 64 and has a downwardly extending projection 63', which extends through a longitudinal slot 65 in the upper part of the swivel rail and into an opening in the upper side of the rack 28. The connections intermediate the end of the lever 56 and the swivel shuttle racks are in duplicate, one set at each end of the loom.

By means of the thus described mechanisms motion is communicated to each set of swivel shuttles independently from the vibrator gears 46 of the shedding or shuttle box operating mechanism through the intervening connections, there being one vibrator gear 46 and intervening connections for each set of swivel shuttles, so that each set can be operated independently of the other, according to the movements of the shedding or shuttle box operating mechanism, regulated by the Jacquard. An up and down motion is communicated to the swivel shuttle rails and the swivel shuttles carried thereon, to raise the same above the race of the lay and allow the movement of the fly shuttles and lower the same to carry the swivel shuttles into the shed by the two vertical upright rods 33. The lower end of each rod 33 is pivotally attached to the front end of an arm or lever 66, fast on rock shaft 50, which extends across the loom and is supported at each end in the lower end of a bracket 51. One of the arms or levers 66 has a rearwardly extending portion or arm, which carries a roll 68, to be engaged by a double cam on the bottom shaft 7. The revolution of this cam through roll 68, depresses the rear end of the arm or lever 66 and rocks the shaft 50 and raises the levers 66, fast on said shaft, and through rods 33 positively raises the swivel shuttle rail and the swivel shuttles carried thereon. The weight of

the swivel shuttle mechanism tends to keep the roll 68 in engagement with its cam on the bottom shaft 7, so that in the continued revolution of this cam the low part of said cam will allow the swivel shuttle rail to be lowered by its own weight. This double cam with reference to the bottom shaft permits the swivel shuttle rail and the swivel shuttles to be raised and lowered twice consecutively—that is, the swivel shuttles may be used to make two consecutive picks and put in two colors between two filling threads put in by the fly shuttle. While the swivel shuttle mechanism is in operation, the fly shuttle mechanism is thrown out of operation by the sliding pick mechanism and when the fly shuttle mechanism is in operation, the lever 66 is held or locked down at the end which is engaged by the cam on the bottom shaft 7, as long as the fly shuttle mechanism is in operation, the swivel shuttle mechanism is in its raised position above the shuttle race. As soon as the fly shuttle mechanism is out of operation the locking mechanism releases the lever 66 and allows the same to come in engagement with and be operated by the double cam.

When the swivel shuttles are to operate, the sliding pick mechanism is automatically operated, and the fly shuttle mechanism thrown out of operation. The swivel shuttle rail carrying the swivel shuttles can now be lowered into and raised out of the shed for two consecutive beats of the lay through the double cam, levers 66, and vertical connector rods 33 (it will be understood that there is a lever 66 and rod 33 at each end of the loom), and then the fly shuttle operated, and so on. Each set of swivel shuttles is operated to weave their threads on to the fabric according to the indications of the Jacquard (or any other) pattern mechanism operating through the harness shedding or shuttle box operating mechanism to communicate motion to the swivel shuttles, first in one direction and then in the other.

Instead of using a double cam on the bottom shaft 7 for operating roll 68 on the levers 66, a single cam may be used; but with the double cam two consecutive threads of different color may be woven on the fabric by two sets of swivel shuttles between the ordinary filling threads put in by the fly shuttle. *(Crompton and Knowles Loom Works.)*

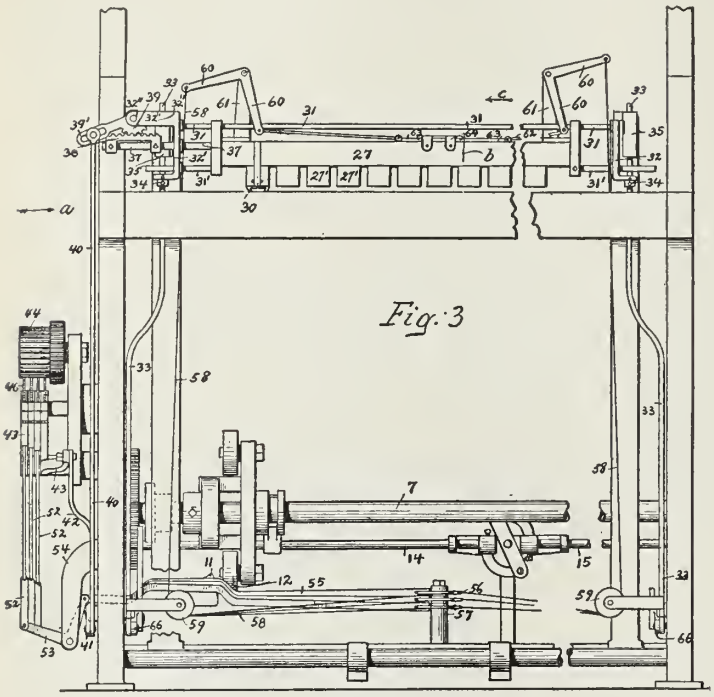


Fig. 3

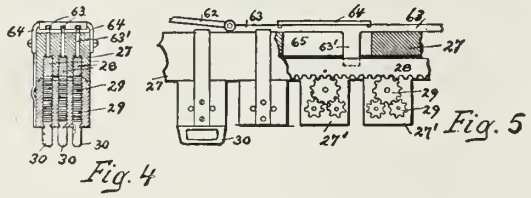


Fig. 5



Fig. 4

## WIDMER'S SHUTTLE DRIVING MECHANISM FOR NARROW WARE LOOMS.

The objects of the mechanism are, to prevent the shuttle noses from dropping, to reduce the friction on the driving mechanism, and to insure a clear passage of the shuttle through the shed.

Fig. 1 is a vertical sectional view of the mechanism and Fig. 2 is an enlarged (compared to Fig. 1) horizontal view of part of it.

$a$ indicates the batten, a series of vertical lathe plates $a^2$ being connected to its back by screws $a'$, said plates being connected at their upper ends by a connecting strip $a^3$ and near the top of the batten by another strip $a^4$, which forms a pocket for the reeds.

The shuttle block is composed of two sections, the main one $b'$ has its front portion removed to form a recess for the reception of the lower one $b^2$, said sections being secured together by screws $b^3$ enclosed in thimbles $b^4$. In the rear section is formed a cavity $b^5$ for the reception of the shuttle pinions $c$, said pinions being journaled on the thimbles $b^4$ for which reason each is provided with a central bore. $d$ denotes a longitudinal groove formed in the top surface of the batten, in which is arranged the actuating rack bar $e$, made of soft wood.

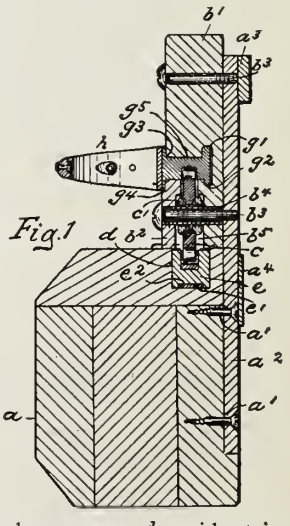


Fig. 1

To prevent wear and render the rack bar as easily movable as possible, metallic strips $e'$ are inserted between the lower surface of the rack bar and the corresponding surface of the groove $d$, said strips being inserted in a longitudinal channel $e^2$ in the rack bar. These strips are arranged in a series with spaces

between, the object being to preserve the flexibility of the rack bar.

Each pinion $c$ consists of a toothed disk composed of wood papier mâché or other material having on each of its faces a bushing $c'$, each being provided with a projection $c^2$, received by a cavity $c^3$ in the face of the pinion. This bushing is made of raw hide which is self lubricating and thus obviating any whistling sound that may accompany the rotation of the pinions.

The shuttle races consist of channels having upper and lower grooves $g'$ $g^2$, the lower edge $g^3$ of the channels being cut away to form another groove $g^4$.

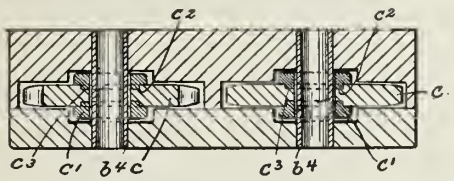


Fig. 2

Between the grooves $g'$ and $g^3$ is thus produced a widened bearing surface $g^5$ for the shuttles. Each point of the shuttle $h$, is brought as near as possible to the plane of the back of the latter thus making the shuttle points as far away as possible from the line of convergence of the shed, in turn insuring a clear passage of the shuttle. *(A. and S. Widmer, Paterson, N. J.)*

## OLDFIELD'S SHUTTLE DRIVING MOTION FOR NARROW WARE LOOMS.

The object of the mechanism is to provide ball bearings for the star wheels which drive the shuttles, as well as to those star wheels which drive the toothed rack which operates the star wheels previously referred to, which drive the shuttles; these ball bearings reducing the friction to a minimum.

Fig. 1 is a front view of the batten of a narrow ware loom, partly broken away, to show the new

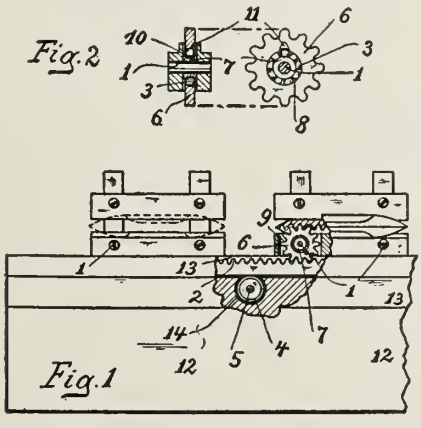


Fig. 1

mechanism. Fig. 2 shows the star wheel, which drives the shuttle, in elevation and section.

Examining illustrations it will se seen that the pin 1, which provides an axial support for the pinion gear 6, does not engage directly the said gear, but engages a disk 7, mounted thereon and of slightly greater thickness than said gear, which latter is formed with a central circular opening 8, large enough to receive the disk, and has cut in the circumferential wall of said central opening, a groove 10. The disk 7 is also formed with a circumferential groove. Interposed between the grooves of the disk and gear is a ring of balls 3. To accomplish the insertion of said balls 3, the pinion gear 6 is provided with a notch 11, cutting into opening 8 nearly to the center of the groove 10 of said pinion. The pinion 6 is made of raw hide, thus by slightly springing the same or by forcing the balls 3 through notch 11, said balls are placed in the position above mentioned. When thus in place, balls 3, while being free to travel in their circular race, are unable to leave the same without springing the gear or forcing the balls through notch 11. The disk 7 equals in thickness approximately the width of the recess 9 and is inserted in said recess as a complete structure, being held in place therein by the insertion of the axial pin 1. The pinion 6 being of somewhat less thickness than disk 7, cannot come in contact with the walls of said recess 9, but may revolve freely upon its supporting ring of balls 3 with no appreciable frictional resistance.

With reference to the rack 2 it will be seen that the same rests at intervals on rollers 4, which latter are also mounted on ball bearings to insure their free revolution. To receive rollers 4, the batten 12 is recessed from its back side, providing circular recesses 14, cutting into the raceway 13. The rollers 4 have formed upon their back side (not shown) a pinion gear which engages narrow inverted supplemental rack teeth (not shown) on the lower side of the rack 2. It will thus be seen that the rollers 4 are not revolved simply by frictional contact with the rack 2. Said rolls are, as stated, formed with teeth that mesh with the supplemental rack teeth previously mentioned, and are thus caused to revolve in unison with the reciprocating movement of the rack. This construction prevents all possibility of flat spots being formed upon the rolls, as might result if the rolls become "stuck" and fail to rotate.

The roller 4 is mounted on pin 5 in substantially the same manner that pinion 6 is mounted on the pin 1; but as said hub is of somewhat greater width a double system of raceways and balls 3 is provided. These raceways are provided in the wall of the circular opening of the roller 4 and in a tubular piece mounted on pin 5, corresponding to disk 7, and like the latter said tubular piece is of slightly greater width than the width of the roller 4, that is adapted to revolve around it.

The balls 3 are inserted in their raceways through notches (not shown) provided in the opposite ends of roller 4, such notches corresponding to the notch 11 of the pinion 6.

The roller 4 and the tubular piece, with the balls 3 inserted between them, form a device complete in itself, adapted to be mounted on pin 5, as before stated. When mounting said device upon the pin 5, a washer is also mounted thereon at each end of the tubular piece and that end of pin 5 that engages the back frame of the batten, passing through a boss, formed on said frame, and by means of a nut, located on the threaded end of the pin, the several elements mounted thereon are clamped between said boss and the head of pin 5.

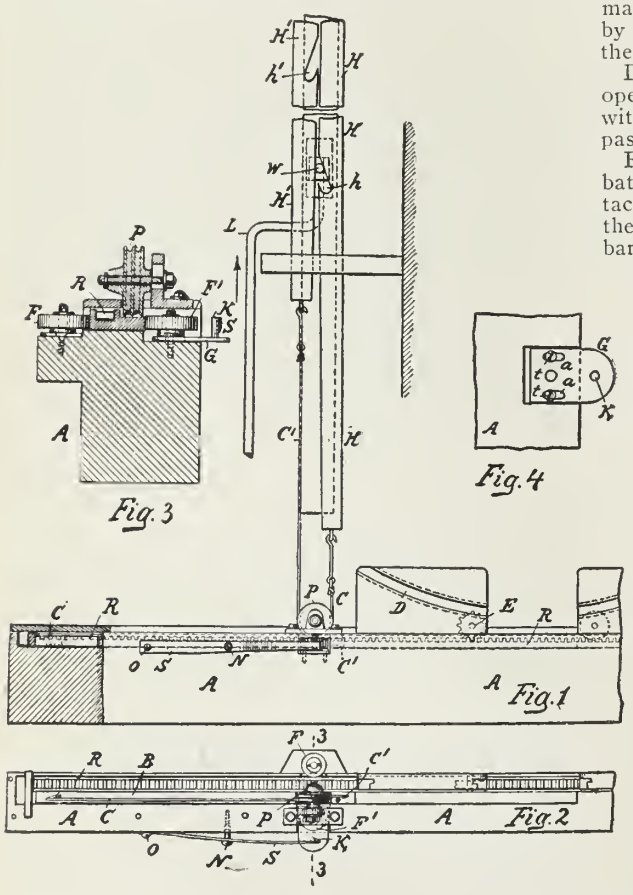
In securing the latter device in position, the several back frames are so located at the back of the batten 12 as to cause their respective rollers to raise the rack 2 out of engagement with the bottom of the race 13. Suitable arrangements are provided that when the teeth of the rack or those of the engaging pinion gear become worn the gear can be readily adjusted to carry its teeth into close mesh with the rack teeth.

The described manner of supporting the rollers 4 permits the free revolution thereof as the rack 2 is moved reciprocally thereon and positively prevents appreciable friction. *(Edwin Oldfield, Norwich, Conn.)*

## STADLER'S METHOD OF OPERATING SHUTTLES IN NARROW WARE LOOMS.

This construction relates to looms in which the shuttles are operated by means of a shuttle rack bar, and the object of the improvement is to prevent the derangement of the shuttles by controlling the movement of the shuttle rack bar.

In looms not provided with such a controlling device, and especially in fast running looms, the shuttle rack bar as it reciprocates in its groove or channel in the batten often moves faster than the loom itself is working and sometimes strikes against the end of the groove with such force as to cause the rack bar to rebound, thereby throwing the shuttles out of place. These improper movements of the shuttle rack bar cause the relative positions of the marionette hooks to become so changed that they will be operated out of their proper order, resulting in a misweave and necessitating the stopping of the loom.




The object of the new mechanism is to avoid this difficulty by steadying and controlling the action of the shuttle rack bar and preventing its moving in its groove except as it is pulled by its actuating cords, thereby permitting a high rate of speed without disturbing the normal action of the loom. This is accomplished by means of the devices shown, which illustrate the said mechanism as applied to a loom adapted to weave narrow goods, as ribbons, in which the shuttle rack bar is operated by means of marionette hooks and its connecting parts.

Fig. 1 is a front elevation of a part of a loom with the new mechanism attached thereto, showing a portion of the batten, partly in section, and the marionette hooks and their operating pin and the connections with the shuttle rack bar. Fig. 2 is a plan view of the same, the marionette harness being omitted, as is also the top of the batten, exposing to view the shuttle rack bar. Fig. 3 is a section, on an enlarged scale, on the line 3-3 of Fig. 2. Fig. 4 is an enlarged plan view of the sliding plate, upon which is mounted one of the antifriction guide rollers.

A is the batten, provided with a groove or channel in which the shuttle rack bar R is caused to reciprocate by means of the cords C C', which are attached at one end to the piece B, secured to the side of the shuttle rack bar R, and at the other end to the marionette sticks H H', which latter are operated by the pin W on the driving rod L, engaging with the hooks *h h'*.

D is the raceway of the shuttle, which latter is operated by means of the pinion E, in engagement with the rack bar R. P is the pulley under which pass the cords C C'.

F is an antifriction guide roller mounted upon the batten A on one side of the rack bar R and in contact therewith. F' is a similar roller mounted upon the sliding plate G on the opposite side of said rack bar R.

The sliding plate G is provided with slots *a* and is held in position by the guide screw heads *t*, but so as to permit the plate being moved toward or away from the rack bar R, the extent of such movement being regulated by the length of the slots *a*. The plate G is also provided with the pin K, against which presses the free end of the spring S, thereby forcing the plate G inward and bringing the roller F' into contact with the side of the rack bar R. The other end of said spring S is made fast to the batten at O, and the degree of pressure of the spring S upon the pin K is regulated by the screw N. The antifriction guide rollers F F' revolve with each movement of the rack bar R, it being held as tightly as desired between the two antifriction guide rollers F F' and its movement prevented, except as the rack bar is pulled to and fro by the cords C C'.

The loom may be run at a high speed without danger of the rack bar running ahead of the proper action of the loom, or rebounding when it strikes the end of the groove, and the derangement of the working of the loom consequent thereon, will thus be avoided. *(William Strange Co., Paterson, N. J.)*

## BATTEN, SHUTTLE BLOCK AND SHUTTLE FOR NARROW WARE LOOMS.

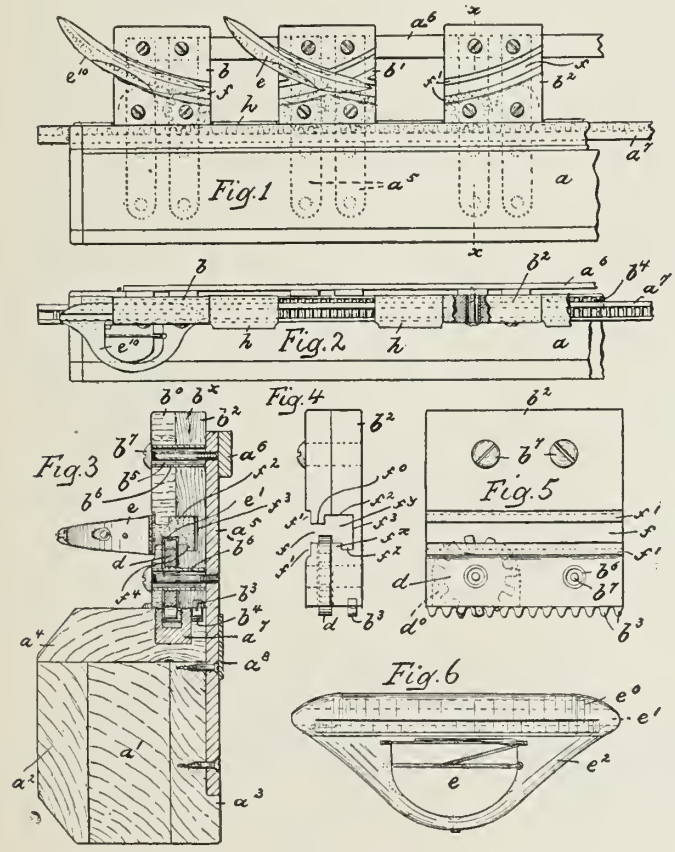
This construction consists in providing a narrow ware or ribbon loom with a batten and shuttle blocks, wherein the shuttle blocks can be readily removed from and readjusted on the batten.

These shuttle blocks are also provided with grooves or races furnishing increased bearing surfaces for the shuttles to be operated therein, whereby all further

dropping or depressing of the noses of the shuttles is prevented and the latter are at all times in proper alignment, yet said grooves or races allow the shuttles a clearance in all directions in case of any roughness which may occur through the ordinary wear and tear of the batten.

Fig. 1 is a front elevation of the improved batten, partly broken away and having two shuttles arranged in the shuttle blocks; Fig. 2 a top plan view of Fig. 1 partly in section, the central shuttle block and the shuttle arranged therein being removed; Fig. 3 an enlarged sectional view on the line $x$ $x$ of Fig. 1, the shuttle being shown in engagement with its actuating pinion; Figs. 4 and 5 a front and end elevation, respectively of one of the shuttle blocks, showing the same provided with a straight shuttle race; and Fig. 6 an enlarged top plan view of one of the shuttles detached.

$a$ represents the batten, consisting of a series of vertical strips $a^1$, $a^2$, $a^3$, glued together and also glued




to the horizontal top strip $a^4$, the grain of which latter runs at an angle to the top surface of the batten, while the direction of the respective grain of the vertical strips runs in an alternate or opposite direction to each other, by which arrangement the warping of the batten is reduced to a minimum and the shrinkage of the top strip $a^4$, if any, will be in a vertical direction. The top strip $a^4$ is provided near its rear portion with an elongated groove, into which is glued a rack bar $b^4$. Adjacent to said rack bar and slidingly arranged in an elongated groove is the actuating rack bar $a^7$, adapted to operate a series of pinions $d$, arranged in recesses $d^0$ of the shuttle blocks $b^2$ and revolubly mounted on the sleeves or bushings $b^5$, which latter penetrate the vertical holes $b^5$. Screws $b^7$, of smaller diameter than the internal diameter of said bushings, secure said shuttle blocks to the vertical braces $a^5$. Said vertical braces are secured to the rear portion of the batten by screws or in any desired manner and are connected at or near their top portions by a horizontal brace or connecting bar $a^6$.

Each shuttle block is composed of two wooden plates, the grain of the rear one $b^x$ being at right angles to the grain of the front one $b^0$. Said plates are glued together, and thus furnish a shuttle block of great strength and durability, having its shrinkage and warping reduced to a minimum.

In the shuttle blocks $b^2$ are arranged the curved or straight shuttle races, each of which consists of the groove $f$ and the adjoining recesses $f'$ (on the front portion of the block) and of the elongated channel or chamber $f^y$, the back $f^3$ of which is parallel with the back of the shuttle block and at right angles to the top $f^2$ of said channel and forms with said top a sharp edge or corner. In the lower portion of said channel is arranged an elongated groove $f^z$, which latter, together with the lower recess $f'$ forms a bridge or shoulder $f^x$, while the top portion of the channel $f^y$, together with the upper recess $f'$, forms a bridge or shoulder $f^0$.

The shuttle races are adapted to be engaged by the runners $e^0$ of the shuttles $e$, which runners for that purpose conform in shape to that of the shuttle races. Each runner is provided in its lower portion with an elongated rack bar $e^1$, adapted to be engaged by the teeth of the pinions $d$.

Each shuttle is constructed of two pieces—that is to say, of the runner $e^0$ and of the nose or front portion $e^2$—which are glued together, the runner having been previously bent to the proper circle from a piece of straight grained wood. The nose or front portion of the shuttle is also of straight grained wood and thus furnishes, together with its runner, a shuttle which is very durable and strong, (as there is no cross grain to it), especially on the points which are apt to chip off; however, the shuttles may be machined out of one piece of straight grained wood after the same has been bent into the proper shape or curve.

By the peculiar construction of the shuttle blocks, the greatest bearing surface for the shuttle is furnished by the rear plate $b^x$, the shuttles being run on the end grain of the wood, which is the hardest wearing surface in any piece of wood.

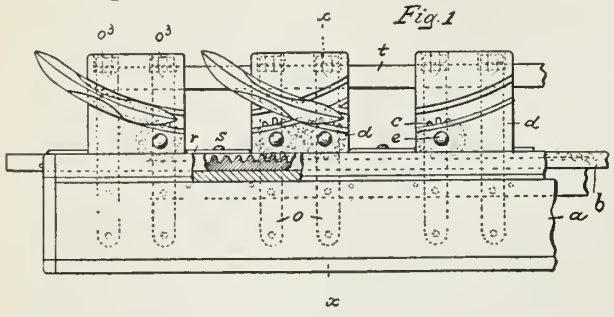
Each shuttle block $b^2$ is provided at its lower rear portion with a rack bar $b^3$ glued into a groove in said block, adapted to engage the rack bar $b^4$ in the top of the batten $a$, whereby the shuttle blocks are held in proper position, the grooves or races for the shuttles being always in true and proper alignment. This alignment is made possible by the screws $b^7$ penetrating holes $b^5$ in the shuttle blocks, which holes are of larger diameter than said screws. *(O. W. Schaum, Phila.)*

## SECURING SHUTTLE BLOCKS TO BATTENS FOR NARROW WARE LOOMS.

This arrangement is an improvement to parts described in the previous article and consists in providing means for securing the shuttle blocks to the battens.

Fig. 1 is a front elevation of a portion of a batten, partly in section, and of three shuttle blocks arranged thereon. Fig. 2 an enlarged sectional view on the line *x-x* of Fig. 1, the actuating pinion and its axle being shown in full.

Fig. 1




*a* represents the batten, provided in its top portion with an elongated groove in which is slidingly arranged the actuating rack bar *b* for the pinions *c* in the shuttle blocks *d*, which pinions are revolubly mounted on axles *e*. The rear portion of the top of the batten *a* is beveled, as at *f*, and supports the shuttle blocks *d*, which are each provided with a bottom surface *g*, inclined correspondingly with the bevel *f* of the batten.

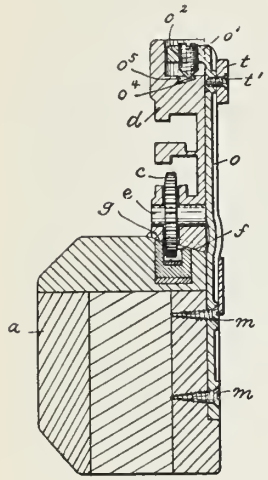



Fig. 2

Each shuttle block is held in normal position by means of brackets *o*, constituting a backing for the shuttle block and having their lower ends secured to the batten *a* by means of screws *m*, while the upper portion of each bracket carries an arm or projection *o'*, provided with an aperature $o^2$, in which is adjustably arranged a set screw $o^5$, adapted to bear upon a metallic disk $o^4$, arranged in a socket $o^5$ in the recessed top portion of the shuttle block. The bottom of the socket $o^5$ is inclined reversely to the plane of the inclined bottom surface of the shuttle block, by which arrangement a firm and accurate connection between the shuttle block *d* and the batten *a* is attained.

The exposed portions of the actuating rack bar *b* are covered by plates *r*, occupying the space between adjoining shuttle blocks and removably secured to the batten by screws *s*. The vertical brackets *o* are connected at or near their top portions by a horizontal brace or connecting rod or bar *t*, secured to said brackets by screws *t'*.

To remove the shuttle block, the screws $o^3$ are operated and afterward the said block is tilted forward and lifted from its position. To replace the block, it is reseated on the batten and the set screws are then manipulated sufficiently to clamp the block tightly against the brackets.

From the foregoing it can be seen that the shuttle blocks can be readily and quickly secured to the batten and that the said blocks will always be true with relation to said batten and are prevented from lateral movement by means of the plates *r*. *(O. W. Schaum, Phila.)*

## WOLLENBERG'S BATTEN FOR NARROW WARE LOOMS.

The object is to produce a batten for weaving narrow ware fabrics, which can be easily and quickly taken apart for the purpose of repairing or adjusting the actuating rack bar for the pinions operating the shuttles.

Fig. 1 is a front elevation of a portion of this batten and of the parts carried thereby, with certain portions broken away. Fig. 2 is a top plan view of the left hand portion of Fig. 1, and Fig. 3 an enlarged sectional view on the lines *x-x* of Fig. 1.

The lay consists of the rabbeted or recessed base $a^0$ and the top of the lay *b* proper, which latter is removably secured to the said base by means of a series of screws *b'*, and forms with the back *a* of the base $a^0$ an elongated groove, in which is slidingly arranged the actuating rack bar *c*, which rests upon an elongated strip *d*, extending the entire length of the batten and bearing with its rounded end portions against the ends or stops *a'* of the said batten. The strip *d* is of a width substantially equal to the width of the rack bar *c*, and is loosely and thus removably placed within the elongated groove heretofore mentioned.

The rack bar *c* actuates the pinions *e*, which in turn operate the shuttles *f*, guided in the guide blocks *g* and *h*, secured to the back *i* of the lay or batten.

When the rack bar is to be taken out for the purpose of repairing the top or lay proper, the latter is removed by simply loosening the screws *b'* and the shoe or supporting strip *d* withdrawn from its normal position, whereby the said rack bar is allowed to drop out of engagement with its respective pinions

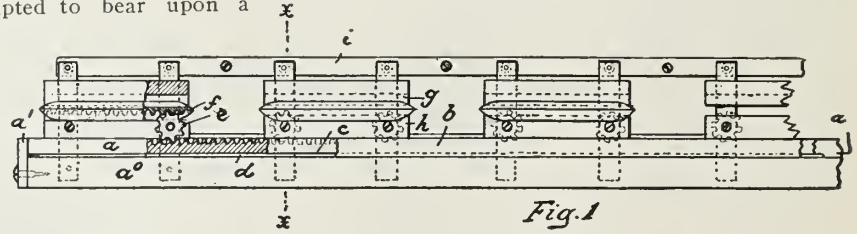



Fig. 1

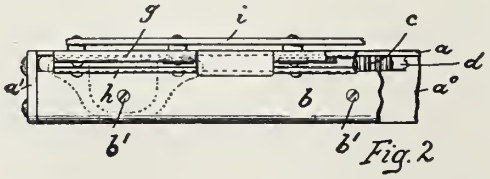



Fig. 2

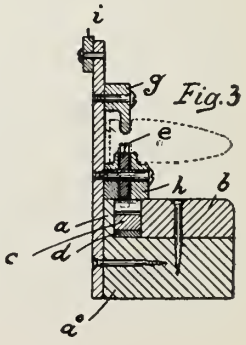
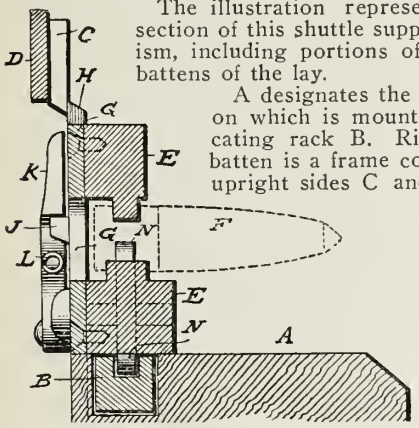



Fig. 3

upon the top of the base $a^{\circ}$, from where it can easily be taken. On the other hand, when the lower surface of the rack bar has been worn off at certain places and thus the engagement of its teeth with the pinions cannot be relied upon, the shoe or supporting strip $d$ is slightly raised up at said places by inserting between the lower surface of the shoe and the top of the base strips of paper, cardboard, or the like. *(Isaac Wollenberg, Paterson, N. J.)*

## SUPPORTING MECHANISM FOR SHUTTLES FOR NARROW WARE LOOMS.

The construction refers to a guide or carrier of a shuttle for narrow ware looms, whereby said shuttle or carrier, or both, may be readily removed without disturbing the other adjacent parts on the beam or batten, provision being also made for locking the block or carrier in position without interfering with the operation of the shuttle.




The illustration represents a vertical section of this shuttle supporting mechanism, including portions of the beams or battens of the lay.

A designates the batten of a lay, on which is mounted the reciprocating rack B. Rising from said batten is a frame consisting of the upright sides C and the cross bar D, the latter connecting the upper ends of the former.

A block forming a guide and carrier for the shuttle F, consists of upper and lower bars E, separated to form a race for the shuttle and having secured to them the connecting plates G, whose inner sides are inclined and freely connected with inclined sides of the uprights C after the manner of a dovetailed joint H, whereby the guide may be raised and lowered on said uprights while being prevented from lateral displacement.

Projecting from the plates G are the studs or lugs J, adapted to be engaged by the dogs K, which are mounted on the uprights C and are drawn toward each other, and thus held in engagement with said studs by spring L.

Mounted on the guides are the pinions N, which engage with the rack on the shuttle F and with the rack B of the beam or batten, by the operation of which the shuttle receives reciprocating motion.

When, however, for any purpose it is desired to remove the guide or shuttle, or both, the dogs are drawn outwardly, so as to clear the studs J, when the guide may be raised or entirely removed, the block and shuttle thus being accessible.

When the guide is returned to its normal position, the studs J ride on the noses of the dogs until they clear the shoulders of the same, when said dogs spring inwardly and engage with the studs J, thus also again controlling the guide against upward displacement.

The adjustment of the plates G is accomplished by vertical and horizontal slots, respectively, in the upper and lower portion of the said plates, whereby they may be vertically separated to a greater or less extent and moved laterally. The device is applicable to straight, circular, and fly shuttle lays. *(M. Saile and S. D. Wright, Phila.)*

## OBLIQUE SHUTTLE DRIVE FOR NARROW WARE LOOMS.

In this loom the batten is furnished with straight shuttles, reciprocated above and below slanted slots, through which the warp passes in a slanting direction. By this arrangement the slots may be placed closer together, (leaving space only for a driving gear) thus permitting a greater number of fabrics to be woven in a given width of the loom.

Fig. 1 is a front view and Fig. 2 a back view of the batten.

$b$ are the slanted slots from both sides of which extend grooves $c$, running parallel to the oblique sides of the slots $b$ and extending over and below the neighboring slots $b$. In said grooves, fit the shuttles $d$, which are reciprocated in the following manner: In a recess of the batten is journaled a rack $f$, which is shifted to and fro by cords $g$, guided around pulleys $h$ and fixed to the rack $f$. The pulleys rotate on pivots $i$. In an angle bracket $k$, fastened to the back side of the batten, are located the journals $l$, just in the middle between two slots $b$. To these journals $l$ are fixed cog wheels $m$, which mesh with the rack, so that by the reciprocating movement of the latter the journals $l$ are correspondingly rotated. The journals $l$ carry two other driving wheels $n$, one above each other. The back side of each of the shuttles is provided with a rack which is also embedded in its groove $c$, but is made accessible from behind by a recess $s$, so that it may be engaged by one of the pinions $n$ on journals $l$. Each shuttle will thus be reciprocated by two pinions $n$—a lower one at the right side of its corresponding slot and an upper one at the left side of the slot. The lower pinion, engaging the shuttle, first drives it in the inclined direction to the upper pinion, which, receiving the shuttle, carries it to the end of its stroke and back again to the lower pinion. *(Wilms and Schroers, Barmen and Krefeld, Ger.)*

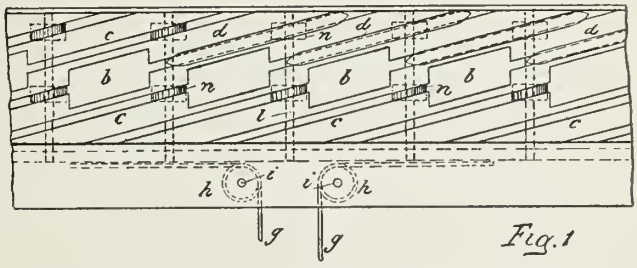



Fig. 1

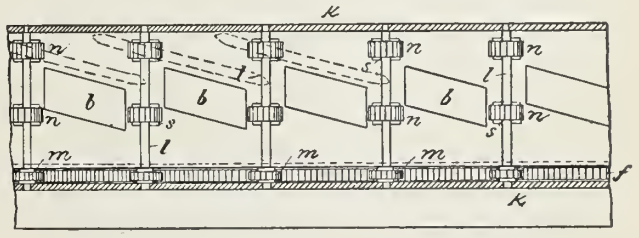


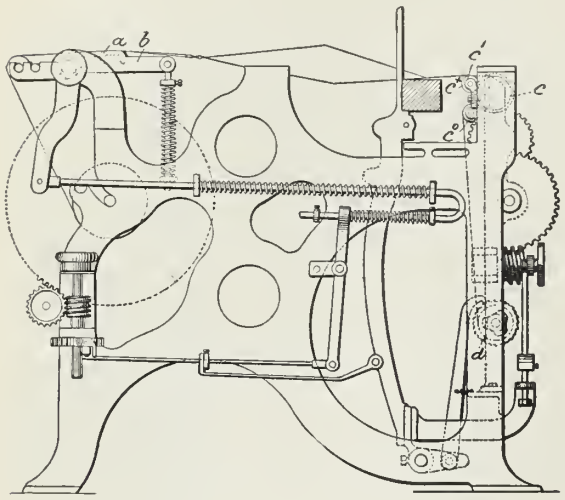

Fig. 2

# LET OFF MECHANISMS.

## THE MASON WARP SLACKENING MECHANISM AND TAKE UP ROLL.

The illustration is a side elevation of parts of a loom having the devices added.

The slackening device has for its object the slackening of the warp as the filling is beat in by the lay, so as to relieve, to some extent, the warp threads of the




strain when the reed strikes the fell of the cloth. This is accomplished by means of a rest or cross bar $a$, on arms $b$, between the whip roll and lease rods and running parallel with them. This rest $a$ is worked up and down against the warp in the desired manner by means of a connection of levers between the arm $b$ and the lay sword. In place of the regular breast beam there is used a take up roll $c$, which is a sand roll, holding the cloth tightly, and around which the cloth passes in its travel to the cloth roll $d$.

The use of take up roll $c$ in place of a breast beam greatly lessens the distance between the reed and the place where the cloth is held taut, in turn doing away with bagging of the cloth when the reed beats up the filling. Between the take up roll $c$ and the lay is placed a vertically adjustable cloth supporting roll $c^x$, mounted on stands $c'$.

The face of the cloth woven can be varied by means of this roll or bar, for when it is desired to have the filling show more prominently than the warp, or, in other words, to "cover" more, the roll or bar can be raised. This acts to tighten the warp threads when the filling is being beaten in, and the latter by reason of its greater slackness can be lifted by the reed dents at the moment of beating in, to thereby cover the warp threads, and by lowering the cloth support $c^x$, the upper warp threads are slackened, and made to cover, or be shown more distinctly, as is sometimes desired.

The cloth in passing from the reed goes over roll $c^x$, over and under the take up roll $c$ to roll $c^0$, and thence to the cloth receiving roll $d$. *(Mason Machine Works.)*

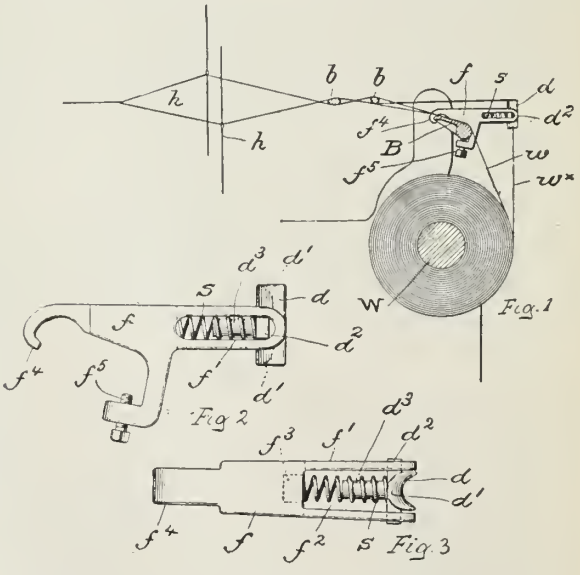
## ROBINSON'S SELVAGE SLACKNER FOR COTTON LOOMS.

In weaving, the selvage threads are subjected to much greater strain than the threads of the body warp, owing to the fact that as the lay beats up, the reed spreads the warps laterally at the fell and as the lay recedes the cloth contracts. This lateral movement of the warp threads is greatest at the selvage, and as a consequence the selvage threads are unduly strained and thus frequently break. The object of the new device is to relieve this excessive strain on the selvage thread, in turn improving quality and quantity of production.

Fig. 1 in section, represents a portion of a loom with the new device applied thereto. Fig. 2 is an enlarged side elevation of the new selvage warp guide, and Fig. 3 is a top or plan view thereof.

Referring to Fig. 1, the main or body warp threads $w$ are led from the warp beam W, up over a whip bar B, and pass thence to the lease rods $b$ and the harnesses $h$. The selvage warp threads $w^x$ at each side are gathered together and pass over yielding mounted guides (one at each end of the whip bar or roll) to the lease rods.

These guides consist of a longitudinally grooved bar $d$, rounded at its ends as at $d'$, and having lateral lugs $d^2$, which enter and are guided by horizontal slots $f'$ in a stand $f$, bifurcated at its rear end at $f^2$ Fig. 3, to receive the guide, which occupies an upright position. A spring $s$ rests at one end in a socket $f^3$ in the stand and at its other end surrounds a stem $d^3$, extended forward from the guide, the spring tending to maintain the guide in its rearward position. The




stand has a jaw $f^4$ and a clamping screw $f^5$ to hold it in place on the end of the whip bar B.

When the lay beats up and the reed exerts a greater tension on the selvage warps $w^x$, they act to draw the guides $d$ forward, compressing the controlling springs

s more or less, according to the strain, so that while said warps are maintained at the proper working tension the guides yield to relieve the undue strain. As the lay moves back the strain on the selvage warp is reduced and the slack is taken up by the guide springs.

The selvage threads are thus yieldingly supported independently of the body warp, and are free to yield when subjected to strain without reference to body warp. *(Mason Machine Works, Taunton, Mass.)*

## PERHAM'S LET OFF FOR COTTON LOOMS.

This device consists in a let off mechanism for looms in which the pressure of the brake mechanism is made to vary with the thickness or diameter of the layers of the threads upon the warp beam, being greatest when the layers are thickest and least when the threads are almost expended, so that the rotation of the warp beam is varied in accordance with the depth of the layers on the beam and a uniform amount of thread is let off at all times.

Fig. 1 represents in side elevation a portion of a loom having its warp beam equipped with this let off mechanism. Fig. 2 shows additional means for locking the warp beam against rotation when the reeds of the lay beam are in engagement with the cloth. Examining Fig. 1 it is seen that the warp beam has at its ends, flanges *c*, and is provided with a gear wheel *f*, meshing with a pinion *g* on a stud shaft *h*, journaled in the frame. The stud shaft *h* is equipped with a friction or brake wheel *i*, with which the brake mechanism coacts in retarding the rotation of the warp beam as the warp threads are gradually drawn therefrom during weaving. *j* is a long lever pivoted at *k* to the loom frame and having its upper end *j'*

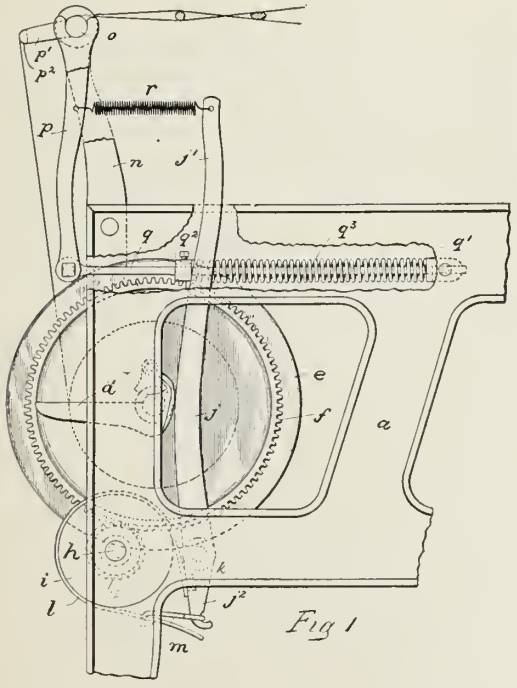


Fig 1

extending above the framework of the machine. One end of the strap *l* passes around the rim of the brake wheel *i* and is secured to the lower end $j^2$ of the lever *j* slightly below the pivot *k*, while its other end is secured to the extreme lower end of the lever *j* by a link *m*, having a hooked end adapted to take in any one of several holes made in the strap *l*.

If the upper end *j'* of the lever *j* is moved to the right, the strap *l* is freed from frictional engagement with the brake wheel, and if moved to the left the friction of the strap against the wheel is increased.

Upon supports *n*, extending up from the frame *a* of the loom is mounted a shaft *o*, having a depending arm *p* and laterally and rearwardly projecting arms $p^1$, connected by a bar $p^2$, constituting a feeler. The lower end of the arm *p* is pivoted to rod *q*, passing loosely

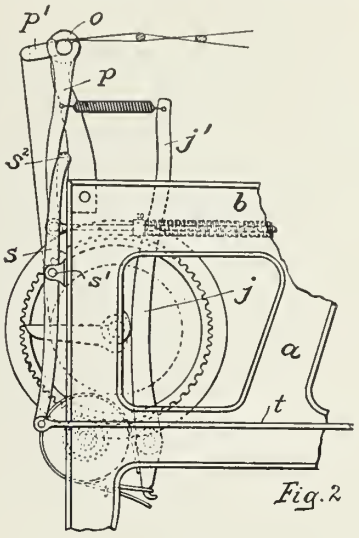


Fig. 2

through an eye *q'* on a bracket secured to the loom frame, said rod being provided with an adjustable collar $q^2$, and between it and the eye *q'* and around the rod *q* is placed a presser spring $q^3$.

The upper end *j'* of the lever *j* is connected to the arm *p*, at a distance from the shaft *o* of about one third of its length, by a tension spring *r*.

The warp threads, previously wound upon the warp beam, pass over the bar $p^2$ of the feeler and from thence to the heddles. The springs are adjusted until the parts are in normal position and the brake strap locks the brake wheel against movement. Then the warp threads, under the tension of the cloth roll and the take up devices, draw upon the feeler with sufficient pressure to throw the lower end of the arm *p* to the right against the pressure of the spring $q^3$, and thereby allow the upper end of the lever *j'* to move to the right far enough to decrease the frictional engagement of the brake mechanism, so that the warp beam can slowly rotate and the threads can be drawn from it. When the beam is first put on the loom, the layers of thread are so deep that the threads pass from it over the feeler at an angle greater than a right angle to the latter, where they exercise their least stress or force upon it and their greatest stress upon the brake, and as they are gradually reeled off, the diameter of the layers becomes less and less and the pressure upon the feeler is correspondingly increased as the threads approach a right angle to it.

Therefore it will be seen that the friction of the strap and brake wheel is greatest when the leverage of the threads upon the warp beam is greatest, and least when the diameter of the layers of thread upon the warp beam is diminished, and consequently their leverage upon the beam is decreased. The main pressure of the warp is borne and resisted by the spring $q^3$, which is also sufficient to normally

counterbalance the spring $r$, but when the tension of the warp is sufficient to compress the spring $q^3$, the movement of the feeler arm changes the tension of the spring $r$ and causes the lever $j$ to release the brake wheel sufficiently to relieve the tension on the warp.

Means are also provided for locking the warp beam against rotation when the reeds of the lay strike the cloth and what increases the tension on the warp threads, and consequently partially rotates the warp beam (in looms working on conditional friction let off), so that at the next pick the warp threads are more or less loose, resulting more or less in an irregular and uneven fabric.

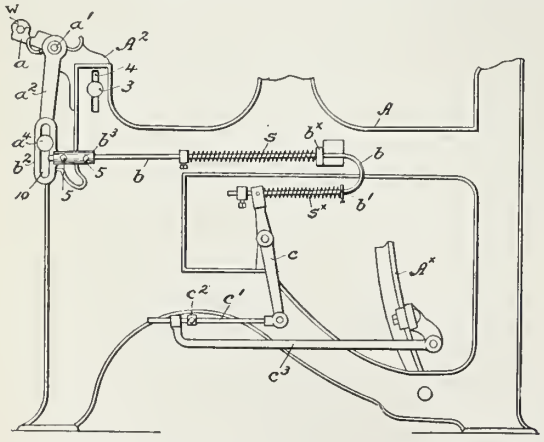
To remedy this trouble a locking lever $s$ is employed in connection with the new let off mechanism which locking lever is fulcrumed at $s'$ on the loom frame $a$, and has a projection $s^2$ at its upper end to extend behind the arm $p$. The lower end of the lever is connected by a link $t$ with the lay sword, (not shown) so that each time the lay is thrown forward the upper end of the lever is thrust rearward until the projection $s^2$ engages the lever $p$ and prevents it from yielding under the increased tension of the warp threads, and consequently the brake mechanism remains locked to the brake wheel and the warp beam is prevented from unwinding.

When the lay is in its inoperative position, the projection $s^2$ is withdrawn from the lever $p$, which is thus free to move. *(Charles F. Perham, Lowell, Mass.)*

## NORTHROP'S LET OFF MECHANISM.

This mechanism has for its object the production of means for permitting the whip roll stand of the let off mechanism to be raised or lowered, as desired, without interfering with the position or operation of the other parts of the mechanism.

The illustration is a side elevation of a loom provided with the new mechanism shown as applied to the well known "Bartlett" let off mechanism, which latter includes a rocking carrier for the whip roll W, the carrier comprising the supporting arms $a$, attached to a rock shaft $a'$ which has a depending rocker arm $a^2$, pivotally connected with a bent rod $b$, longitudinal-




ly movable in a fixed bearing $b^x$ on the loom side A, said rods having springs $s$ $s^x$, the latter being held between an adjustable collar $b'$ on the rod and the perforated end of a lever $c$. A link $c'$ connects the lever with the usual pawl carrier, (not shown), and a collar $c^2$ on the link is engaged by the actuator rod $c^3$, connected with and operated by the lay sword $A^x$.

Usually the rod $b$ is jointed or pivoted directly upon the rocker arm $a^2$; but in the new mechanism the stands $A^2$ for the whip roll rock shaft $a'$ are made vertically adjustable by means of set screws or bolts 3 and vertical slots 4 in the loom sides, and as the stands thus can be raised or lowered, as desired, a simple and efficient self adjusting coupling or connection between the rocker arm $a^2$ and the rod $b$ is thus devised.

The lower end of the rocker arm $a^2$ is provided with a boss which supports a headed pin or stud $a^4$, the latter entering a longitudinally slotted upright fin $b^2$ on the sleeve like body $b^3$ of the coupling member, which latter receives the end of the tension rod $b$ and is secured thereupon by set screws 5. The stud $a^4$ enters the slot 10, and when the whip roll stands $A^2$ are vertically adjusted the stud slides up or down along the slot, so that the position and operation of the other parts of the let off will not be interfered with, while the pivotal connection between the rocker arm $a^2$ and rod $b$ is always maintained. *(Draper Co.)*

## ARRANGEMENT FOR REGULATING THE TENSION OF THE WHIP ROLL.

The object of the mechanism is to provide means for the yielding of the whip roll under the strain as applied to the warp during weaving, providing springs capable of being easily regulated to the proper tension

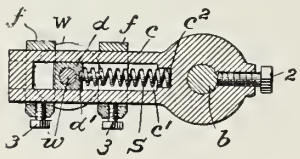



Fig. 1

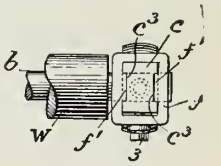



Fig. 2

required by the fabric woven, since certain kinds of goods require more or less tension than others.

Fig. 1 is an enlarged sectional view of one of the guides for the whip roll journal boxes, showing the arrangement of the means for regulating the movement of the roll; and Fig. 2 is a rear end elevation of one of the guides with a part of the whip roll and the rock shaft to which the guides are secured.

The device is to be attached to the top of the rear end stand of the loom frame (and above the warp beam) as usually carrying the whip roll, etc., one of the devices being applied to each side of the loom.

$b$ indicates the rock shaft of a loom, supported at each side by the end stands of a loom frame, and to which shaft are attached by set screws 2, two guides $c$, one at each side of the loom, extending rearwardly above the warp beam, being longitudinally slotted at $c^1$ to receive the journal boxes $d$, of the journals $w$, extended from the end of the whip roll W. A spring S is interposed between each journal box and the inner end of the slot $c^1$, a pin $d^1$ on the box entering the outer end of the spring, while the inner end of the spring is held in a recess $c^2$ in the guide $c$.

By means of the springs the roll W is yieldingly maintained at or near the outer ends of the guides, while it is movable toward the fell of the cloth when sufficient strain is exerted upon the warps.

The guides $c$ are longitudinally grooved on their inner and outer faces, as at $c^3$, to receive the ears $f^1$ on the inner sides of two like stops $f$, mounted on each arm in front of and behind the box $d$, said stops being loop like or open to embrace and slide upon the guides. Set screw 3 extends through each stop and bears against the guide to hold the stop securely in adjusted position.

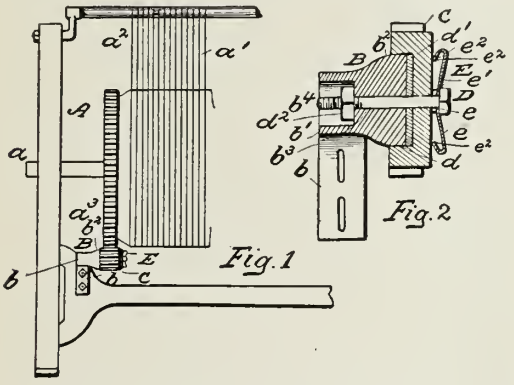
The extent of movement of the journal boxes and consequently of the whip roll W, is regulated by the

position of the stops *f* on the guide arms *c* without reference to the strength of the springs S, while the latter will still yieldingly control the movement of the roll within the limits set. *(Draper Co.)*

## PECKHAM'S CONDITIONAL LET OFF FOR COTTON LOOMS.

The objects of this device are, first, to provide a let off by means of which cloth may be evenly woven; secondly, to construct such let off of but few parts, and, thirdly, to provide means for preventing the operators from tampering with the let off so as to thin the cloth.

Fig. 1 is an end view showing a portion of a loom having the new device applied thereto. Fig. 2 is a







vertical longitudinal sectional view of the let off device shown on an enlarged scale.

A designates a part of the frame of the loom, *a* the warp beam, *a'* the warp threads, $a^2$ the whip roll, and $a^3$ a large gear wheel mounted on and carried by the warp beam *a*.

B designates a bracket, comprising a plate *b* bolted to the frame A, and a stud *b'*, formed with said plate at the upper end thereof. This stud is of increased diameter at its outer end $b^2$ and is formed with a central bore $b^3$ which terminates in a socket $b^4$ in the end of the stud.

C is a gear wheel which is in mesh with the gear wheel $a^3$ of the warp beam. It is formed in one side with a circular socket *d* which accommodates the end $b^2$ of the stud, said end forming the bearing on which said wheel rotates. In this socket is located a friction disk *d'* interposed between the end of the stud and the body of the wheel.

D is a bolt passed through a central opening in wheel C and also through the bore $b^3$, its extreme threaded end being extended into the socket $b^4$. Upon this end is a nut $d^2$ screwed up to the inner end of the socket. E is a spring bearing plate interposed between the head *e* of the screw D and the outer face of the wheel C. This plate is formed with four radiating arms *e'*, which are bent slightly outward, and their extreme ends $e^2$ are bent inward so as to bear against the face of the wheel. In this way the amount of friction it is desired to place against the wheel C can be controlled by the turning of the screw D. As the latter is tightened the wheel is brought more tightly against the friction pad located within its socket.

By locating the screw nut within the socket of the stud, operators are prevented from tampering therewith. Since there are practically only four pieces in the entire attachment, the danger of the latter getting out of order is reduced to a minimum. The new device will also reduce the chance for "smashes," for if the shuttle stops between the reed and the cloth, the friction will let off quick enough to loosen the warp, and thereby prevent a smash. *(James M. Peckman, Fall River, Mass.)*

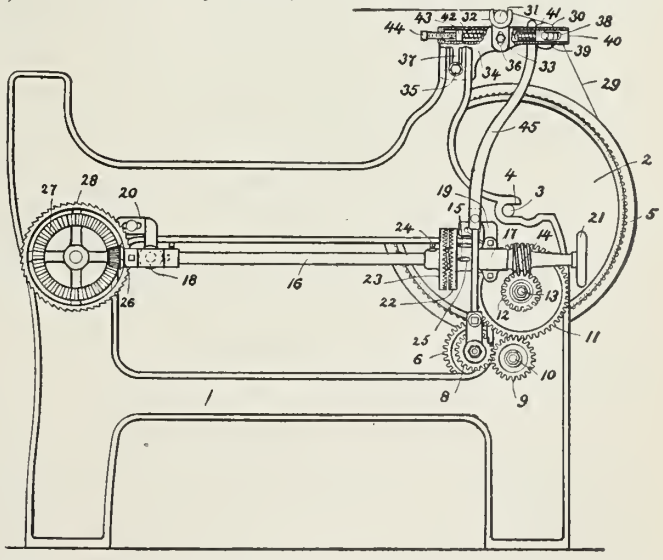
## COCKERILLE'S POSITIVE LET OFF FOR COTTON LOOMS.

The illustration represents in side elevation one side frame of a loom with the new device applied thereto, certain small portions adjacent to the whip roll being represented as broken away or in section in order to better illustrate certain features otherwise not visible.

1 designates the loom frame. 2 is the warp beam, mounted and supported by journals 3 in bearings 4, provided therefor in the side frames of the loom. 5 is the gear with which the warp beam is provided. 6 is a pinion meshing with the said gear and mounted upon a short shaft supported on the loom side, the said shaft having also a pinion 8, which meshes with a pinion 9, that is mounted to turn on a stud or pin 10, applied to the loom side, the said pinion 9 meshing also with a gear 11.

12 is a worm gear which turns in unison with the spur gear 11, both being mounted on stud 13, applied to the loom side.

14 is a worm which engages with the teeth of the worm gear 12, said worm being formed or provided on the sleeve applied to one end of the side shaft 16. 17 and 18 are bearings in which the side shaft 16 is mounted to turn, said bearings being connected with brackets 19 and 20, which are bolted to the loom side.



The sleeve previously referred to, is free to turn upon the shaft 16 independently of the latter and is equipped with a hand wheel 21, enabling it to be turned by hand for the purpose of adjusting the warp beam—that is to say, turning the said wheel to partially unwind the warps therefrom or to wind them thereon, as and when required. Upon the forward end of the sleeve 16 is mounted one member 22 of a finely toothed

clutch. A pin 15, projecting from the sleeve, passes through a slot 25 in the hub of said clutch member 22 and compels the sleeve and said clutch member to turn in unison. The other member 23, of the said clutch is fixed upon the side shaft 16, by means of the clamping screw 24. A spiral spring in interposed between the two clutch members 22 and 23, and normally holds the member 22 pressed away from the member 23 and out of engagement therewith. Fast upon the forward end of the side shaft 16 is mounted the beveled pinion 26, which meshes with the beveled gear 27, which rotates in unison with the ratchet wheel 28 of the take up mechanism.

The warp yarns 29, on their way from the warp beam 2, pass over a whip roll 30 and then over a guide roll 31, from which last it extends to the heddles. The guide roll 31 has its ends journaled in bearings in brackets 32, the latter being fixed by bolts 33 to the stands 34, the said stands in turn being fastened by bolts 35 to the loom sides. Each bracket 32 is slotted vertically, as at 36, to enable it to be adjusted up and down upon the corresponding stand 34, and the upwardly projecting portion at the rear of each side frame is slotted vertically at 37 to permit of vertical adjustment of the corresponding stand 34, upon the said side frame. Each stand 34, projects rearwardly, and it is slotted transversely, as at 38, for the reception of the journal 39, which is provided on the corresponding end of the whip roll 30, the slot permitting horizontal movement of the said journal forward and rearward in the loom. Each stand 34, is formed also with a horizontally extending hole or opening 40, in which is placed a block 41, a spiral spring 42, and a second block 43. The spring 42 is compressed between the blocks 41 and 43, and serves to press the block 41 against the journal 39 of the whip roll 30, and to bear the whip roll 30 rearwardly in the loom.

44 is a set screw acting against the block 43, and by means of which the tension of the spring 42 may be adjusted as required. The tension of the spring 42 determines the tension at which the warp yarns shall be maintained in the course of the weaving.

45 indicates a lever having the free extremity thereof extended up to a position in advance of one end of the whip roll 30. The lower end of the said lever is sleeved on the short shaft which carries pinion 8, and an intermediate portion of the lever engages with the clutch member 22. To the upper end of lever 45 an adjustable projection is applied in the form of a bolt, having one end thereof arranged to come in contact with one end of the roll 30, the threaded stem of the said bolt fitting a threaded hole in the upper end of the lever 45, and having a lock nut applied thereto.

In practice the parts will occupy normally the positions in which they are represented at the right hand side in the illustration with the clutch member 22 separated from the clutch member 23, and the warp beam stationary. In the course of the weaving as the take up motion draws forward the web and increases the tension of the warps, the forward movement which the increased strain or tension of the warps will communicate to the whip roll 30 will cause the said whip roll to press forward the lever 45, which will close the clutch member 22 into engagement with the clutch member 23, which is fast upon the side shaft 16. Thereupon the worm 14 will be caused to rotate in unison with the side shaft 16 and will transmit, through the gearing which has been described, movement to the warp beam and thereby unwind a supply of warp yarns therefrom. Sufficient warp yarns having been unwound from the warp beam to allow the whip roll to recede under the action of the spring 42, the lever 45 and movable clutch member 22 will be allowed to move under the action of the spring as interposed between the two clutch members 22 and 23, so as to open the clutch and cause the unwinding movement of the warp beam to discontinue. In brief, an increase of tension on the warp yarns acts through the whip roll and the lever 45 to close the clutch, so as to cause the warp beams to be driven positively from the side shaft 16 for the purpose of delivering the required fresh portion of the warp yarn. A sufficient quantity or portion of warp yarns having been unwound, the return of the whip roll enables the clutch to be opened again, so as to arrest the unwinding movement of the warp beam.

An important characteristic of the new device is the fact that the motion by which the warp beam is actuated at the required times for unwinding fresh supplies of the warp yarns, is taken from a moving member of the take up motion which is the part of the loom effective in governing or determining the number of picks to the inch in the web, and by providing mechanism such as aforesaid, so as to connect at the required times the warp beam with the take up ratchet, enabling the warp beam to be operated from this take up ratchet, a definite and certain relation between the letting off and the taking up being secured and maintained—that is to say, a predetermined and exact proportion of the one to the other is the result. It is easier to even up the tension and it enables the same tension to be maintained on the warp yarns from one end thereof to the other throughout the weaving.

The roll 31 supports the warp yarns intermediate the whip roll and the heddles and constitutes a fixed rest for the said yarns. This roll takes a large part of the strain which comes upon the yarn at the time of the beat up, thereby relieving the whip roll of the sudden pull forward which is communicated to the warps at such time and holding the warp yarns firmly while the last pick is being driven home by the reed, securing better results in the weaving. The capacity for effecting vertical adjustment of this roll 31, enables to vary within certain limits the action of the warp yarns upon the whip roll. The angle which the warps make in passing around the whip roll varies according as the diameter of the warp beam diminishes in the course of the weaving, becoming greater as the said diameter decreases. A difference in this angle varies the readiness with which a certain degree of tension of the warp yarns acts to carry the whip roll forward. By raising or lowering the guide roll 31, the angle that is formed by the yarn in passing the whip roll is regulated, so that by giving the proper elevation to the said guide roll greater uniformity of angle from the time of beginning with a full beam to practically the emptying of the said beam is secured, than would be possible if the guide roll were not employed. *(Henry C. Cockerille and Jeremiah Clark, Lowell, Mass.)*

## SCHAUM'S LET OFF MECHANISM FOR NARROW WARE LOOMS.

In the illustration this let off mechanism is shown in side elevation, a portion of the rear framework of the loom, being also shown, partially in section and partially in dotted lines.

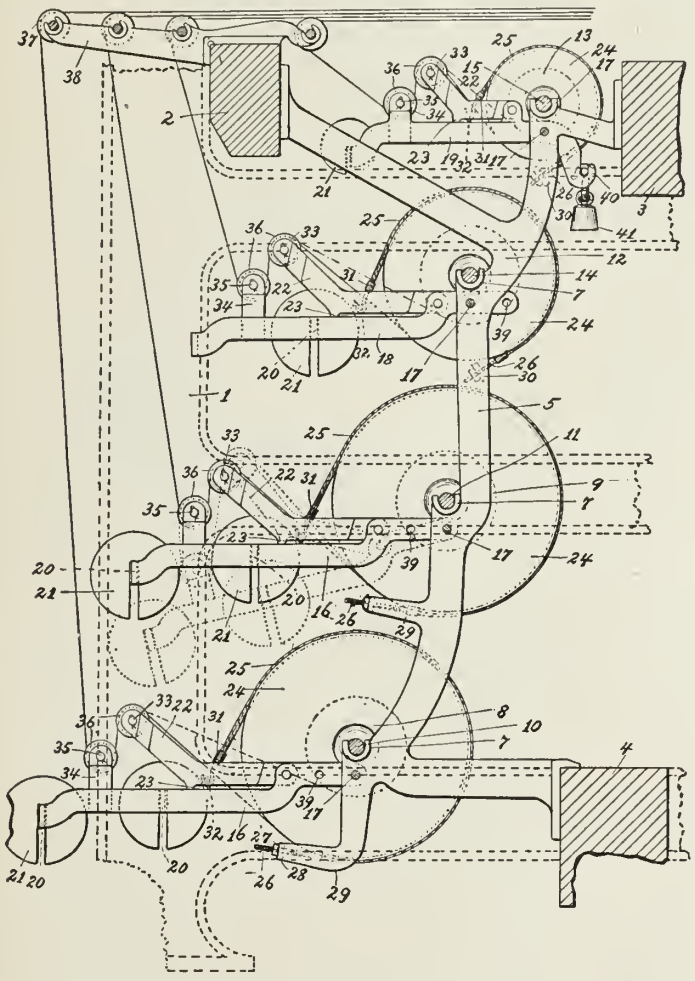
1 indicates the rear portion of the framework of the loom, and 2, 3 and 4 designate three of the cross beams which form a part of the frame and which support the improved let off mechanism. 5 represents one of a pair of side frames or supports having several arms whereby it is secured to the various cross beams. In bearings 7, formed at intervals in the side frames, are journaled the ends of the beam shafts.

The shafts for the ground warp beams 8 and 9 are designated by 10 and 11, and the shafts for the edge and binder warp beams 12 and 13, the latter of which

beams is situated above the former, are designated by 14 and 15.

16 designates levers each of which constitutes one of a pair that are fulcrumed in the side frame 5 at points 17 below the bearings 7 of each ground warp beam, and 18 and 19 each designate one of a pair of similarly fulcrumed levers, the former being for the edge warp and substantially like the levers 16 in shape and the latter being for the binder warp and differing slightly in form from said levers 16. The various pairs of levers are connected by one or more rods 20, serving as racks for weights 21.

22 indicates levers fulcrumed upon and shorter than the various levers previously referred to, each of which is provided upon its under side with a heel or lug 23, with which the longer levers are adapted



to contact when raised. Each of the warp beams is provided at its ends with a peripherally grooved disk 24, in which fit flexible friction devices, each consisting of a band 25, provided at one end with a threaded pin 26, having an adjusting nut 27 and extending, in the case of the two lower or ground warp beams, through enlargement 28 on the end of projections 29, formed upon the side frames 5, and in the case of the upper or binder and edge warps through projections 30, formed on said side frames. The forward end of each band 25, is provided with a hook 31, engaging a bent pin 32, formed upon each lever 22 which are so fulcrumed in the longer levers that their fulcruming points are somewhat contiguous to the points of securing the bands to said levers, so that when their rear ends are actuated their forward ends will have appreciable movement. The shorter levers 22 are angular in shape, their free ends being held by the bands 25 considerably above their fulcrumed ends.

At the ends of the shorter levers and upon rods 33, connecting them, and in vertical brackets 34 integrally formed with each longer lever, and upon rods 35, connecting corresponding brackets, are journaled rollers 36 for the warp which extends from each beam to and over the rollers 36, carried by the levers, and then over other rollers 37, journaled in a pair of arms 38, mounted on the beam 2. Of the longer levers, each of the lower three is adjustably fulcrumed upon the side frames 5 by means of a series of fulcruming apertures 39. The uppermost pair of levers 19 is provided at the rear end with a connecting bar 40 and serves as a rack for the counterbalance weights 41.

In view of the foregoing it will be seen that the motion of the shed in opening will act to raise the longer levers into contact with the heels 23 of the shorter levers, thereby raising the latter and tending to throw out of operation the braking device for the beams, which each disk and band therefore constitutes. This tendency to throw out of operation the braking device is, however, immediately counterbalanced by the consequent tendency of the longer levers to fall. Thus the tension is preserved constantly uniform.

The peculiar arrangement of the levers, permits of a comparatively great movement of the longer levers and an increasing of the distance between them and the shorter levers, leaving to the shorter levers for the most part the function of directly affecting the operation of the braking device. When each longer lever drops, the fulcrumed end of the shorter lever will also drop, moving about its pin 32 as a fulcruming point when said lever is moved downwardly as far as the band 25 will permit. The effect of the dropping of the rear or fulcrumed end of this longer lever is to augment the increasing of the distance between the levers, which would otherwise be the function of the longer lever alone.

Whether the loom is in normal or active operation or not—as, for instance, when it is necessary, on account of an error or mispick to pick out the web and let the warp back—the tension by means of the improved mechanism is constantly uniform, for though the lower or longer lever may drop considerably, its weight is always more or less acting on the warp in conjunction with that of the shorter lever. *(O. W. Schaum, Phila.)*

## FISCHER'S AUTOMATIC WARP TENSION FOR NARROW WARE LOOMS.

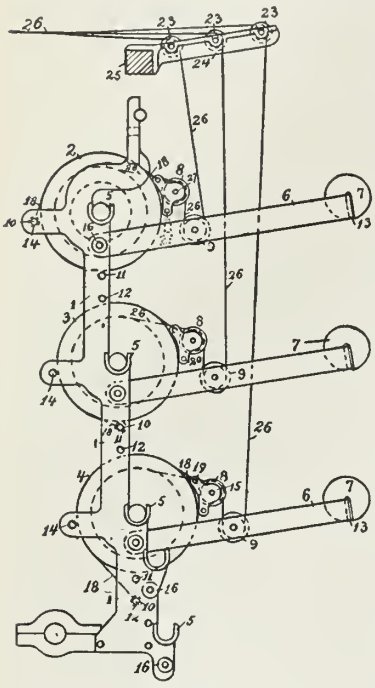
This device relates to that type of let off motions, wherein a friction strap passing around the flanges of the beam imparts thereto the required friction under the control of the warp threads.

The illustration is a side elevation of the new device, showing a part of the loom frame in section and the warp threads as delivered from the beams.

Secured to the loom frame, in desired position to receive the warp beams 2, 3, and 4 (or more), are the

upright stands 1, which are provided at intervals with supporting sockets 5 for the shafts of these warp beams. Projecting from the stands 1 are pins 16, for receiving and supporting the perforated end of the tension frames 6, which are made in a general **U**-shape having spring arms connected by a cross piece on which weights 7 are placed.

An extra pin 16 is shown near the bottom of stands 1, for the purpose of changing the position of the tension frames when desired, such extra pins being also present in connection with the beams 2 and 3, but purposely omitted from the illustration in order to avoid confusion. Between the spring arms of each of the tension frames 6 are supported, to freely rotate, the rollers 9.



Grouped around the bearings or sockets 5 for each warp beam in the stands 1 is a series of holes 11, 12, and 14, adapted to receive the ends of and support a rod 10, which is of uniform dimensions from end to end and extends across the entire loom frame, being readily interchangeable in the holes 11, 12 and 14.

Each warp beam is provided with a head formed with a groove in which rides a roller plate 15. Carried on a pin 27 which is free to rotate in bearings in this roller plate 15, is a roller 8, turning loosely on said pin, the ends of the pin being turned down, forming a shoulder to prevent accidental removal. To one end of the roller plate 15 is connected the strap 18 by means of the hole 19 in the plate, which is engaged by a link which is itself engaged by a hook on the end of the strap 18. The opposite end of the strap is provided with a hook adapted to engage the rod 10.

The adjustment of rod 10 into the different holes 11, 12 and 14, in the stands 1, will cause the strap 18 to engage more or less surface of the beam head and will to that extent vary the frictional energy with which the strap will tend to retard rotation of the beam.

In the end of the roller plate opposite the hole 19 there is provided another hole 20, to which may be connected a tension weight 21, if greater friction is desired upon the beam heads. (See dotted weight in connection with warp beam 2).

Mounted above the stands 1 and in position to guide the warp threads 26, as they are delivered from the beams are a series of rollers 23, having loose bearings in brackets 24, secured to the loom frame 25.

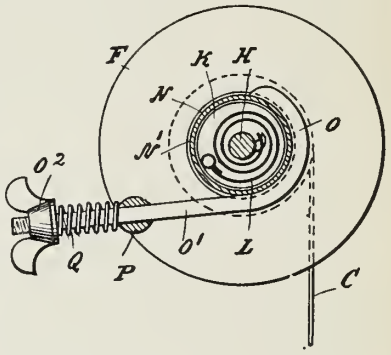
The warp threads from the beams are passed over the rollers 8, carried by the roller plates 15, then down and under the rollers 9 on the tension frames 6, and thence up over guide rollers 23. The effect of this is that the warps coming from rollers 8 tend to press the roller plate 15 and friction strap 18 upon the beam head, and being directly acted on by the tension frame 6 as they pass beneath the rollers 9, they tend to regulate their own tension. Should the frictional tendency of strap 18 and plate 15 become too great, however, the tension frame 6 will be raised by the warps as they pass to rollers 23, and the side arms of the tension frame coming in contact with the projecting ends of the pin 27 will tend to raise said pin and thus the plate 15, to thereby relieve the excessive friction of strap 18 and plate 15, to permit the beam to more freely rotate, and as the tension is thus relieved the tension frame 6 will descend and restore the frictional engagement of the roller plate 15 and strap with the beam head.

The advantages of the new tension device are that it causes a more steady and uniform movement of the warp 26 as it passes to the loom from the rolls 23 and obviates the pulls and jerks incident to the let off of former construction. *(Wm. E. Fischer, Geo. F. Kuett and Chas. Fischer, Paterson, N. J.)*

## FRICTION WARP RACK FOR NARROW WARE LOOMS.

The object is to provide a warp rack arranged so as to be able to regulate the tension of the warp for each individual spool by means of a friction device adjusted to each spool, at the same time reducing the distance the warp has to travel from the rack to the lay.

The illustration is a sectional side elevation of one of the warp spools and its friction device.



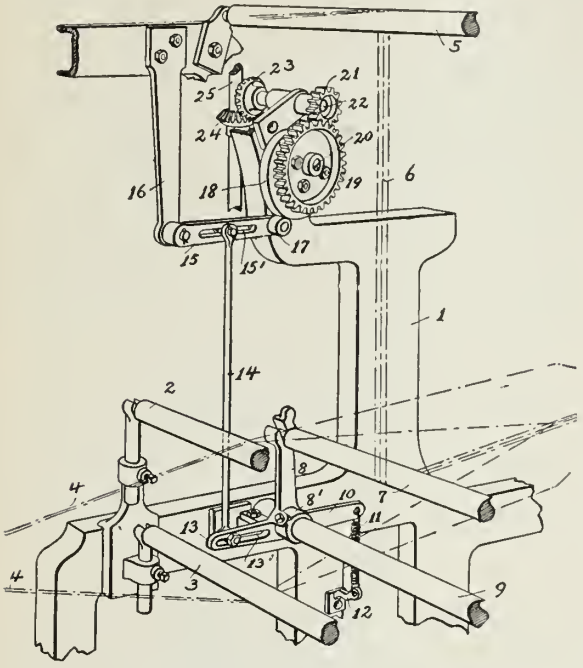

The warp spools F are set two, three or more rows high in an oblique rack situated in the rear of the loom. In the bottom of this rack there are placed as many glass rods as there are tiers of spools. One side of each warp spool is formed with a number of apertures engaged by pins projecting from a disk K, mounted to rotate loosely on the shaft H, and on said disk is secured the outer end of a helical spring L, secured at its inner end to the shaft H, the disk and spring being inclosed in a barrel N, secured to the shaft H. On the peripheral surface of the barrel N is formed an annular groove $N^1$, engaged by a hook O, formed on a shank $O^1$, mounted to slide longitudinally in a bearing P, held to turn on the rack frame as situated in rear of loom. On the outer threaded end of said shank $O^1$ screws a wing nut $O^2$, against which presses one end of a spring Q, coiled on the shank $O^1$ and resting with its other end on the bearing P.

When the shank $O^1$ is pressed on by the spring Q the hook O is held with more or less force in frictional contact with the barrel N, thus by screwing the wing nut $O^2$ inward or outward the frictional contact of the hook O with the barrel N is correspondingly increased or diminished.

The power of the spring is somewhat less than that of the friction device to allow the spring to hold the warp taut; but when the pull on the warp exceeds the tension of the spring L then said spring will exert a pull on the shaft H and turn the latter at the time the pull on the warp is sufficient to overcome the power of the friction device. *(Wm. J. Irwin, New York.)*

## REGULATING THE TENSION OF THE PILE WARPS FOR DOUBLE PLUSH,

woven in looms where two shuttles are thrown across the loom simultaneously.




The illustration shows a portion of a loom frame or arch and the rods over which the body and pile warps pass, having the mechanism for positively moving the pile warp tension regulating rod combined therewith.

1 indicates a portion of the arch at one side of the loom. 2 and 3 are the rods over which the two sets of warp threads 4, forming tne body of the two fabrics, pass. 5 is the rod over which the pile warp threads 6 pass from the pile warp beam. Said pile warps pass under the tension regulating rod 7, which is supported at each end in a slot in the upper end of the arm 8, having a hub 8', which is fast on a rock shaft 9. Extending out from the hub 8' toward the front of the loom is an arm 10, which is connected at its end by a spring 11 with a stationary arm 12, secured to the loom frame. Extending in an opposite direction to the arm 10 from the hub 8' is an arm 13, provided with a longitudinal slot 13', connected through rod 14 with arm 15, having a longitudinal slot 15'. This arm 15 is pivoted on the lower end of bracket 16, secured at its upper end on the loom frame. By means of the slots 13' and 15' in the arms 13 and 15, respectively, the point of connection of the rod 14 with each of said arms may be varied, to thus either increase or decrease the extent of the movement of the tension rod 7.

On the free end of the arm 15 is mounted a roll 17, which engages with the periphery of an eccentric cam 18, bolted to the inner face of gear 19, loose on stud 20. The gear 19 meshes with a pinion 21, fast on a shaft 22, which carries at its opposite end a beveled gear 23, meshing with another beveled gear 24, fast on the upright driven shaft 25. The revolution of the shaft 25 through beveled gears 24 and 23, pinion 21, and gear 19, communicates motion to the cam 18, and through roll 17, arm 15, connector 14, arm 13, and arm 8 the tension rod 7 will be moved inwardly and outwardly, the spring 11 acting to keep the roll 17 in contact with the cam 18.

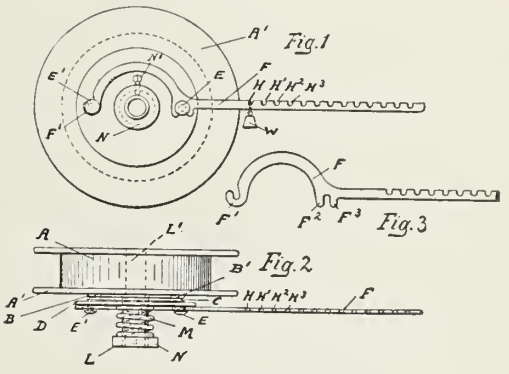
When the pile warps 6 are at the middle position intermediate the bottom and top shed, as shown in the illustration, the tension rod 7 will be at its rearward position, brought there and held there by the cam 18 acting on the roll 17, and when the pile warp threads 6 are in the top and bottom sheds the tension rod 7 will be at its forward position, the shape and revolution of the cam 18 being regulated to bring the roll 17 on the lowest part of the cam at this time.

On the cam 18 there is one high portion and one low portion, therefore, a single revolution of said cam will cause the tension regulating rod 7 to be moved once into its forward position and once into its rear position. The revolution of the cam 18 is so timed as to cause one revolution of said cam for every two picks of the loom. *(Geo. F. Hutchins, Worcester, Mass.)*

## TENSION REGULATOR FOR WARP BEAMS FOR NARROW WARE LOOMS.

Fig. 1 is a side view of this tension regulator, Fig. 2 a top view of it and Fig. 3 a side view of the brake lever.

A indicates the warp beam or spool. Cast on the flange A' of said warp beam is a ring B, having a cone shaped surface B'. Fitting into this is a similar cone shaped surface C cast on a disk D, having on the side opposite to said cone shaped surface two pins E and E', secured to it, and attached to these is a brake lever F, constructed at one end according to a semicircle, one end of which semicircle has a hook F', fitting around the pin E', the other end of the semicircle having a seat formed by two prongs $F^2$ and $F^3$, which prongs embrace the pin E. The other end of the brake lever F is notched with notches H H' $H^2$ $H^3$, etc., in order to support a weight W, which according to the weight being placed in the notch, nearest to the warp beam or farthest away from it, will




form one means of correspondingly decreasing or increasing the tension administered to the warps.

On the side of the warp beam A having the flange A' is the hollow projection L, having a hole L', through which the pin that carries the warp beam passes. Said projection is screw cut externally at the end and has coiled around it a spring M, one end of which bears against the disk D, whereas the other is pressed against a stop bush N, provided with a set screw N'. Inside of this bush N is a split nut, screw cut, to match the screw cut end of projection L, and thus adjusted to the said projection can be screwed in and out, thus allowing the spring M to be contracted or expanded, which presses the disk D, having conical surface C, in the similar conical surface B' on flange A' with greater or less force, thus producing a greater or smaller amount of friction, which is the desired object of the spring's action. *(Alfred and Herman Schiffer, Paterson, N. J.)*

# TAKE UP MECHANISMS.

## CLEMENT'S TAKE UP MECHANISM.

This mechanism has for its object, the production of means whereby the weaver can readily liberate the take up ratchet wheel from its various coöperating de-

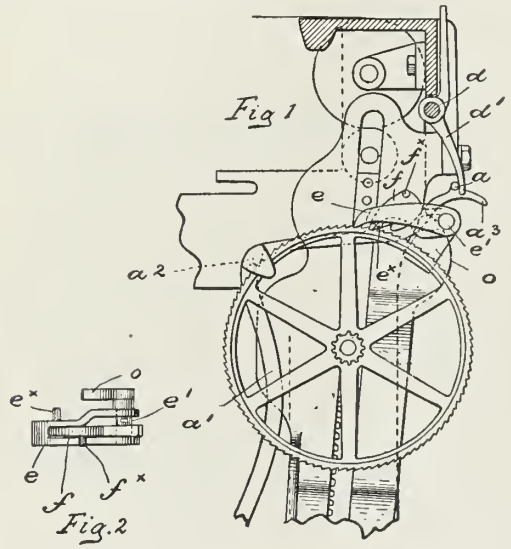


Fig. 2

vices—*i. e.*, the actuating and let back pawls—so that the said wheel may be freely turned by hand, in order that the weaver may repair defects.

Fig. 1 is a vertical section of part of the loom, showing this take up, and Fig. 2 is a top or plan view of the let back pawls.

In the illustration two pawls, *e* and *f*, are shown, bracket *o* on the loom frame has a stud *e'*, which serves as a fulcrum upon which the longer pawl *e* rocks, while the shorter pawl *f* is slotted longitudinally to embrace and slide on said stud *e'* when the pawl *e* is raised sufficiently to disengage it from the ratchet wheel.

Referring to Fig. 2, the pawl *e* is shown as bifurcated, while the pawl *f* is mounted between the branches, a lateral lug $f^x$ on the pawl *f* extending over one of the branches of the pawl *e*.

In order that the ratchet wheel may be simultaneously liberated from all of its connections, the upper end of the pawl carrier $a'$ is extended toward the front of the loom to form a handpiece $a^3$, which can be readily grasped by the weaver. A locking shoulder (not shown) is formed on the pawl carrier to at times coöperate with a projection $e^x$, extended from the let back pawl *e*.

One tooth of the ratchet wheel is taken up by the pawl $a^2$ at each beat of the lay, and the let back pawl *e* prevents retrograde movement of the ratchet wheel except when the rod or shaft *d* is rocked by failure of the filling, at which time the pawl carrier will be disengaged, by the arm $d'$ acting on the lug *a* on said pawl carrier, the pawl *e* will be lifted, and the pawl *f* will permit the wheel to let back as many teeth as are advisable, so as to prevent thin places in the cloth.

Normally the projection $e^x$ of the pawl *e* extends over the pawl carrier back of the locking shoulder (previously referred to); but if the weaver wishes to liberate the ratchet wheel he grasps the hand piece $a^3$ and pushes the pawl carrier backward. This movement disengages the actuating pawl $a^2$, and at the same time the pawls *e* and *f* are lifted until the projection $e^x$ on the former drops in front of the locking shoulder (previously referred to), whereupon the parts will be locked in inoperative position and the ratchet wheel can be turned in either direction, the parts remaining locked until the pawl *e* is lifted sufficiently to withdraw the projection $e^x$ from the shoulder, whereupon the pawl carrier will return to normal operative position. *(Draper Co.)*

## THE CROMPTON TAKE UP MECHANISM FOR SILK LOOMS.

Fig. 1 is a front view of the take up mechanism, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section on line 2-2 Fig. 1, looking in the direction of arrow *b*, same figure. Fig. 3 is a section on line 3-3

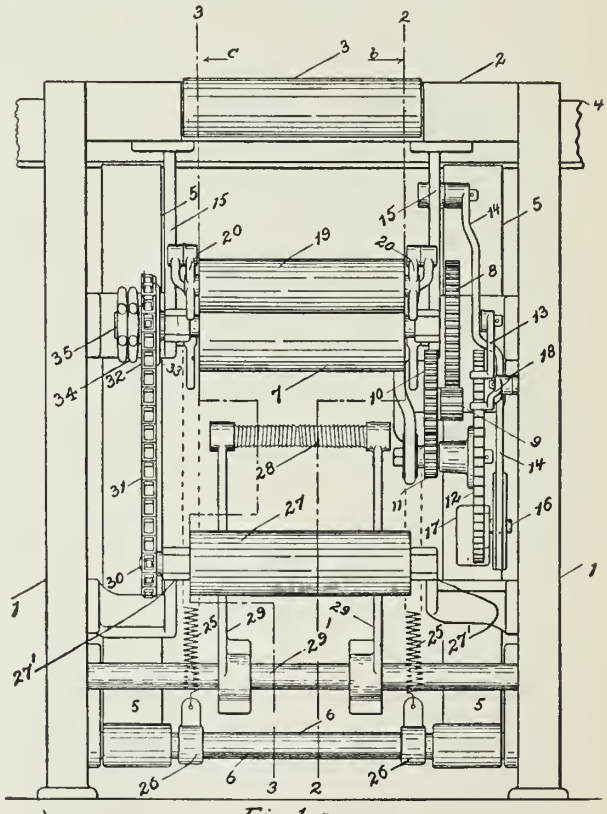


Fig. 1 c

Fig. 1, looking in the direction of arrow *c*, same figure; and Fig. 4 is a sectional detail of the friction mechanism for the take up roll.

In these looms owing to the delicate nature of the material a filling stop motion cannot be used successfully.

1 indicates the loom sides, 2 the breast beam, having a roller 3 located at its front side, over which the woven fabric 3′ passes; 4 indicates the lay, 5 the lay swords secured at their lower ends on the rocker shaft 6.

7 is the take up roll, revolved through gears 8, 9, 10 and 11, driven by ratchet wheel 12, which is moved at every stroke of the lay by pawl 13, pivoted at its

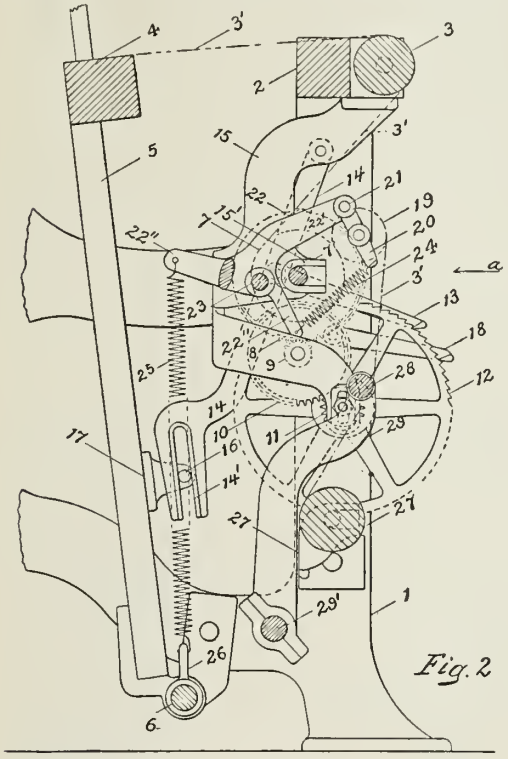



Fig. 2.

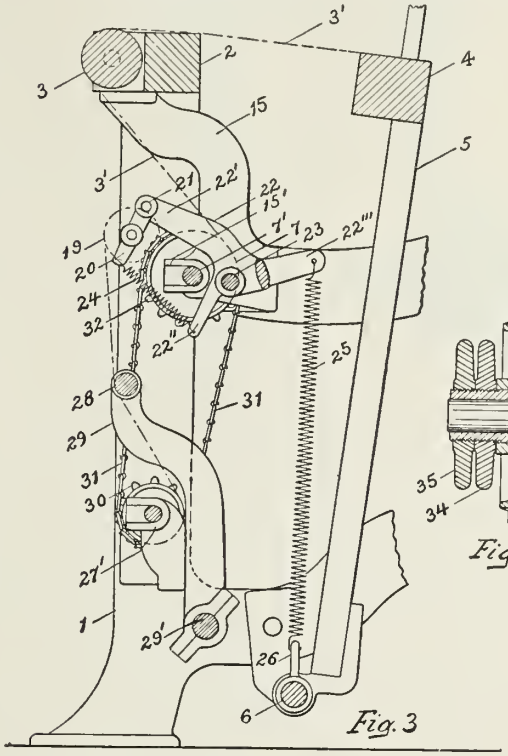



Fig. 3.

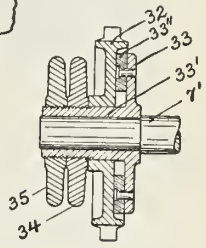



Fig. 4.

inner end on arm 14, pivoted at its upper end on take up stand 15, and provided at its lower end with slot 14′ into which extends and travels roll 16 on stand 17, secured to the front side of one of the lay swords 5. (See Fig. 2.) A second pawl 18, pivoted on the frame, engages the ratchet wheel 12 to hold the same after it has been turned by the pawl 13.

The carrier roll 19 extends on the outside of the take up roll 7 and is supported at each end in an arm or lever 20, which is pivotally supported at its upper end by pins 21 upon arms 22′ of the swinging frame 22, mounted upon the pins 23, supported in the take up roll stand 15.

A spiral spring 24 is attached at one end to the lower end of the lever 20 and at its other end to the downwardly extending arm 22‴ on the swinging frame 22, and acts to press the carrier roll 19 against the take up roll 7.

To the rearwardly extending arm 22‴ of the swinging frame 22 is secured one end of a spiral spring 25. The other end of said spring is secured to a collar 26 on the lay shaft 6.

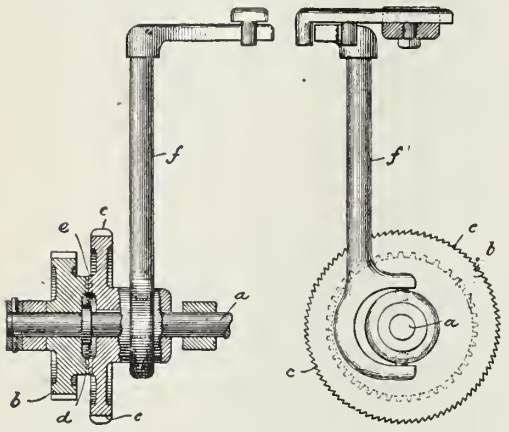
Springs 25 (there is a spring at each end of the swinging frame 22) rock the frame and raise the carrier roll 19 if the fabric 3′ passing over the roll 19 is not drawn down by the action of the lower winding up roll 27, to which winding up roll 27 the fabric 3′ passes from the carrier roll 19 after it has passed over the spreading roller 28, supported in the upper ends of stands or arms 29, secured upon the cross rod 29′. The spreader roller 28 is provided with right and left hand grooves to spread the fabric as it passes over said roller.

The winding up roll 27 is mounted in bearings 27′ on the loom frame and has secured on one end thereof a sprocket wheel 30, around which a chain 31 passes to a sprocket 32, loose on the hub 33′ of the disk or plate 33, fast on the end of the shaft 7′ of the take up roll 7. A friction collar or surface 33″ is secured upon the outer surface of the plate 33, as shown in Fig. 4. The sprocket wheel 32 is pressed against the friction collar 33″ on the plate 33 and is held in frictional engagement to turn therewith by a nut 34, turning on the screw threaded hub 33′ of the plate 33. A check nut 35 is used to hold the nut 34 after it is adjusted.

The sprocket wheel 32 of the take up roll 7 is of greater diameter and has a greater number of sprocket teeth than the sprocket wheel 30 of the winding up roll 27, so that the winding up roll 27 may revolve at greater speed to wind up the fabric and take up any slack in the fabric between the take up roll and winding up roll; but as soon as the slack is taken up, then the tension of the fabric passing over the carrier roll 19 will draw down said roll until the arms 22′ of the oscillating frame 22 come in contact with projecting flanges 15′ on the take up roll stands 15, which act as stops to prevent any further downward movement of the carrier roller 19. The winding up roll 27 cannot now wind up the fabric any faster than it is delivered from the take up roll, and the speed of said winding up roll as the wound up cloth increases in diameter thereon must decrease, and through the friction driven sprocket wheel 32 and the sprocket chain 31 this is provided for, the sprocket wheel 32 turning independently of the take up roll shaft 7′. *(Crompton and Knowles Loom Works.)*

## THE MASON TAKE UP FOR COTTON LOOMS.

The prominent feature of this mechanism is that by means of it the weaver cannot speed the take up abnormally without at once stopping the loom, the take up mechanism being so connected with stopping




means for the loom that the former cannot be thrown out of gear without affecting the operation of the latter.

The new device is explained by means of the accompanying illustrations, being views partially in section, and in side elevation, respectively, of the clutch, forming a part of the connections between the take up and stopping means of the loom.

*a* is a shaft driven at *b* from a spiral gear of another shaft which in turn meshes with a gear on the picker shaft.

*c* is a ratchet wheel for holding the cloth beam in position (by means of a pawl) when the clutch *d e* is thrown out of gear. *f* is the shaft connecting clutch gear with the shipper and stop motion.

The gist of the improvement consists in that the ratchet wheel *c* of the cloth beam cannot be pushed ahead without throwing clutch *d e* out of gear, in turn turning shaft *f* in its bearings, in turn throwing shipper handle out of its keeper notch and thus stopping the loom. *(Mason Machine Works.)*

## OWEN'S TAKE UP MECHANISM.

The object of the device is to secure close winding of the cloth and the proper stretch of same by holding the cloth roll firmly against the sand roll and gradually increasing the pressure with the diameter of the cloth roll.

At the same time the sand roll and the cloth roll are placed so as to project but little beyond the front of the breast beam, thus affording little obstruction—if any—to the weaver.

The illustration is a front view of a loom, the central portion being broken out to more clearly show, on a larger scale, the operative parts of the mechanism, the cloth roll being shown in the position when the cloth is wound on the same, as indicated in broken lines.

A indicates the two side frames of a loom, B the breast beam, C the girth connecting the side frames A, and also carrying the standards D, having guideways E. F is the sand roll, G the gearing for operating said sand roll, and H the cloth roll.

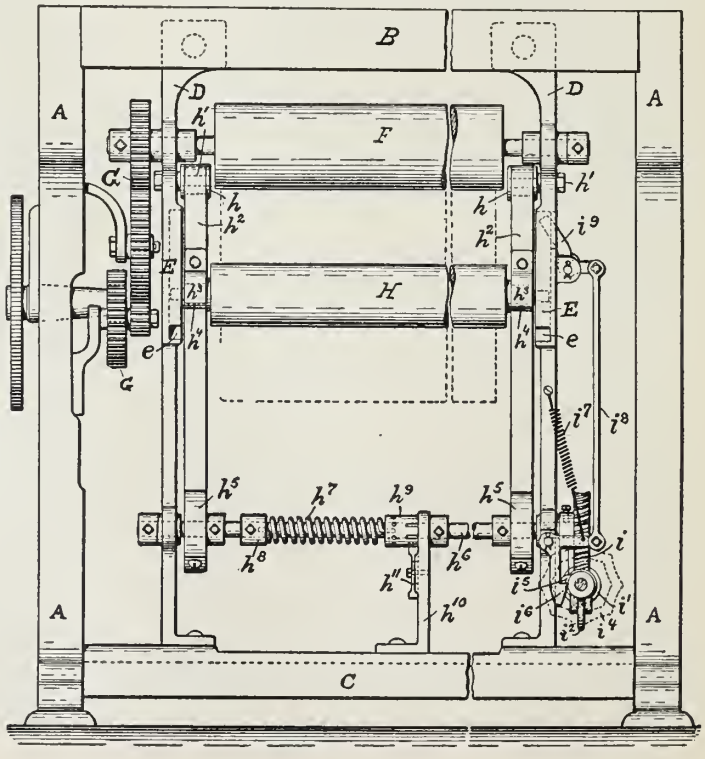
The sand roll F is journaled in the standards D, and below the shaft of the sand roll two collars $h$ are supported on two studs $h^1$. Over the collars $h$ extend the straps $h^2$, having at one end the loop $h^3$ surrounding the collars $h^4$ in which the ends of the cloth roll are supported and extend beyond these collars into the guideways E. The other end of these straps $h^2$ are secured to disks $h^5$, secured on the torsion shaft $h^6$, which is supported in bearings on the lower end of the standards D.

The spring $h^7$ surrounds the torsion shaft, one end of which is secured in the collar $h^8$, which turns with the shaft. The other end is secured to the sleeve $h^9$, which is loose on the torsion shaft and is provided with locking notches. One end of the sleeve $h^9$ bears against the bracket $h^{10}$, through which the shaft $h^6$ extends, and which bracket is secured to the girth C. A pawl $h^{11}$ is pivoted to the bracket $h^{10}$ and engages the notches on the sleeve $h^9$ so that the tension of the spring $h^7$ may be adjusted and act to rotate the torsion shaft.

A worm wheel $i$ is secured on the end of the shaft $h^6$ and a worm $i^1$ is journaled in the bracket $i^2$ connected by a stud to one of the standards D, and is provided with the hand wheel $i^4$.

The portion of the bracket $i^2$ forming the journal bearing for the worm $i^1$ is provided with the cam pawl $i^5$. The bracket $i^2$, with the worm $i^1$, and the hand wheel $i^4$ may be swung into engagement with the worm wheel $i$ or allowed to drop out of engagement with the same. When engaged, the cam pawl $i^5$ rests on the shoulder of the bell crank lever $i^6$ and is supported by the coiled spring $i^7$, one end of which is secured to the bell crank and the other end to the standard D.

The rod $i^8$ connects the bell crank lever $i^6$ with the pawl $i^9$, pivotally secured to the standard D, so that the pawl enters the guideway E.



When a cloth roll is to be inserted, the collars $h^4$ are placed over the shaft of the cloth roll H. The projecting ends of the shaft are then passed into the openings $e$ of the guideways E. The worm $i^1$ is now turned to operate the worm wheel $i$, and by it the torsion shaft $h^6$, and with the same the disks $h^5$, so as to wind up the straps $h^2$ and raise the cloth roll nearly up to the sand roll. The end of the cloth is now passed around the cloth roll H, and by again turning the worm $i^1$ the cloth roll is forced against the sand roll and one end of the shaft of the cloth roll comes in contact with the pawl $i^9$, moving the pawl outward and disengaging the hook of the bell crank lever $i^8$ from the cam pawl $i^5$, which allows the bracket $i^2$, carrying the worm, to drop out of engagement with the worm. The loom being now running operates through the gears G and the sand roll F, and, continuing to weave the cloth, winds the same, by the surface contact of the sand roll with the cloth, onto the cloth roll. The coiled spring $h^7$ on the torsion shaft $h^6$ acts, through the disks $h^5$ and the straps $h^2$, to hold the cloth roll against the sand roll until the desired cut of cloth is completed, when the cloth roll, with the cloth, is removed and another cloth roll substituted. *(Whitin Machine Works.)*

## OWEN'S ARRANGEMENT FOR OPERATING CLOTH ROLL IN CONNECTION WITH THE TAKE UP FOR COTTON LOOMS.

In this construction the cloth roll is held against the sand roll by straps connected with pulleys secured to a shaft acting against the torsional resistance of a coiled spring.

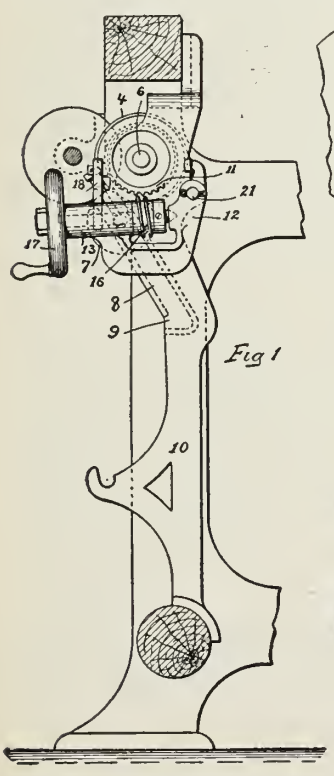


Fig. 1

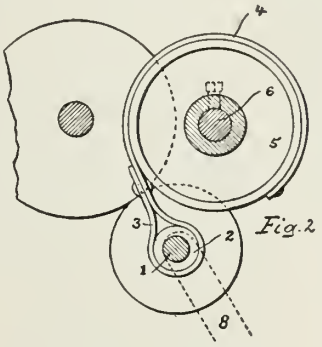


Fig. 2

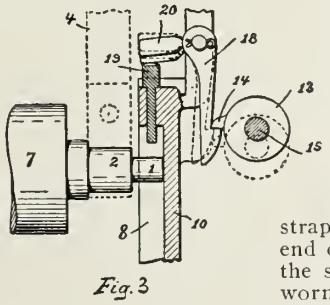


Fig. 3

Fig. 1 is a vertical sectional view of the front end of a loom provided with the new mechanism. Fig. 2 is a skeleton view showing the ends of the sand roll, the cloth roll, and the strap pulley, in their relative positions. Fig. 3 is a front view, partly in section, of one end of the cloth roll showing the stop and knock off device controlling the torsional spring shaft.

The illustrations show placed on the shaft 1 of the cloth roll, near the ends, the rings 2 and around these, the loops 3 of the leather straps 4. The other ends of the straps are secured to the strap pulleys 5, which in turn are secured to the shaft 6, journaled in bearings supported by the standards 10. A torsional spring (not shown) is coiled around the shaft 6, one end of which spring is secured to one of the strap pulleys 5 and the other end is secured in a sleeve loose on the shaft 6 and is provided with pawl seats, in which a pawl enters to hold the sleeve against rotation. This pawl is supported on a bracket, and the sleeve as previously referred to, is provided with holes for the insertion of a rod, so that this sleeve can be turned on the shaft 6 to adjust the tension of the coiled spring and be held in the adjusted position by the pawl.

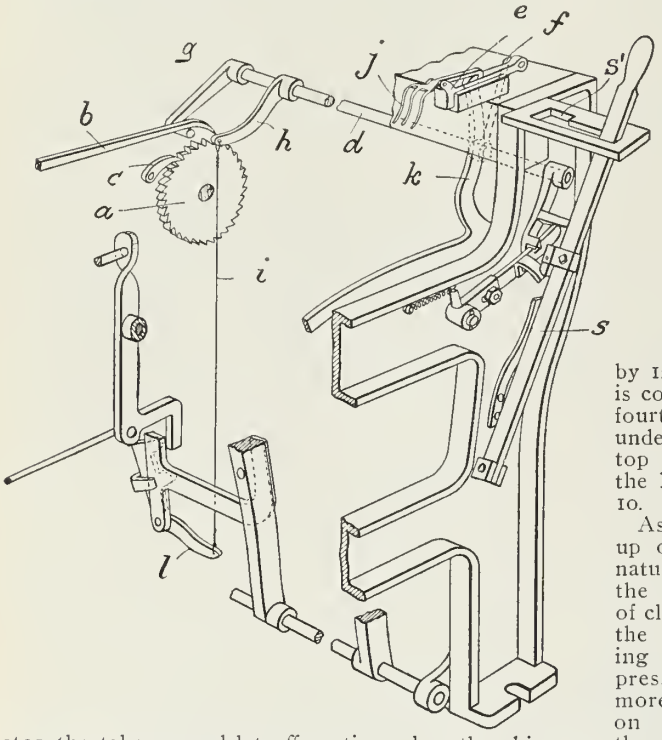
As the cloth roll 7 is built up and increases in diameter by the winding on of the cloth, the ends of the shaft 1 move down in the ways 8 until, when the cloth roll is completed, the ends of the shaft 1 are at or near the openings 9, while the tension of the spring as coiled around shaft 6, has been increased with the increase of the diameter and the weight of the cloth roll.

To remove the cloth roll and replace it with an empty one, there is placed on the shaft 6 the worm wheel 11 and the swinging bracket 12 is pivotally supported on the stud 21, secured to the standard 10. The front part of the swinging bracket 12 has the shaft bearing 13 formed integral therewith, being provided on one side with the projecting pawl 14. The shaft 15 is journaled in the bearing 13, the worm 16 is secured to the shaft 15, and the crank disk 17 is secured on the outer end of the shaft 15. The bell crank pawl lever 18 is pivoted to the standard 10, in which at the upper end of the way 8, is supported the headed pin 19.

When the cloth roll is completed and a new roll is to be substituted, the front of the bracket 12 is raised until the pawl 14 bears on the projection of the bell crank pawl lever 18, the weighted arm 20 of which insures the engagement. The worm 16 is now in engagement with the worm wheel 11. By turning the crank disk 17 the worm will turn the worm wheel, the shaft 6 and the strap pulleys 5, to allow the cloth roll to descend and the ends of the shaft 1 to pass down and out of the openings 9 of the ways 8. The ends of the shaft 1 of the cloth roll are now drawn out of the rings 2. The ends of the shaft of the new cloth roll are inserted into the rings 2 and into the ways 8. The crank disk 17 is now turned in the opposite direction, turning through the worm and worm wheel the shaft 6 and the strap pulleys 5, to wind on the straps 4, thereby raising the cloth roll up when the end of the cloth is secured against the sand roll. As the shaft 6 is locked and cannot turn as long as the worm 16 is engaged with the worm wheel 11, to secure the prompt release of the worm from the worm wheel, the pin 19 is arranged to be lifted by the end of the shaft 1 and acting on the arm 20 of the bell crank pawl lever, to disengage the front of the swinging bracket 12 by swinging the bell crank pawl lever 18 into the position shown in broken lines in Fig. 3, thereby releasing the worm 16 from engagement with the worm wheel. *(Oscar L. Owen, Whitinsville, Mass.)*

## PELTIER'S TAKE UP ATTACHMENT FOR COTTON LOOMS.

This attachment relates mostly to looms running on low texture fabrics, where there is a liability of a thin place being made in the cloth by the loom taking up a few notches after the filling has run out or broken. When the shipper is knocked off by reason of the filling running out or breaking, the loom usually runs for a short time before coming to a full stop because of the momentum acquired by its parts. The take up and let off mechanisms if allowed to operate until the lay comes to rest will therefore advance the warps a short distance without any filling, and it becomes difficult on starting the loom again to lay the next pick close up to the one which was last beat in. It is therefore desirable to stop both the take up and let off mechanisms the instant the shipper is knocked off in order to prevent the advance of the warps and also to maintain them at their proper tension. This is accomplished by the attachment, it working in conjunction with the stop motion so as to automatically




stop the take up and let off motion when the shipper handle is knocked off and is held from action until said shipper handle is replaced again in its keeper notch.

The illustration is a perspective view of the new attachment, shown in connection with that part of a loom to which it is applied.

*a* indicates the take up ratchet wheel operated by take up pawl *b*. *c* is the catch finger acting on the ratchet wheel *a*. *d* is the stop motion rod connected with slide *e* by means of lever *f* and carries at its end the arm *g*, which engages the take up pawl *b* and shipper lever *s*. *h* is an arm also adjusted to the stop motion rod and connected to the let off motion by wire *i*.

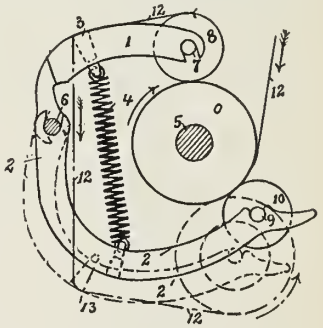
When the filling runs out or breaks, the hook on the filling fork *j* is engaged by the feeler *k* so as to move the slide *e* and rock the rod *d*, which engages the shipper lever *s*, throwing it out of its keeper notch *s'*, thus causing the belt to be shifted and the loom stops. The rocking of the rod *d* by means of arm *g* lifts pawl *b*, throwing it out of reach of the ratchet *a*. The arm *h* is at the same time raised, in turn raising lever *l* and disengaging the let off motion. *(Joseph Peltier and Francis X. Gravel, Lowell, Mass.)*

## CLOTH TAKE UP ROLL FOR LOOMS.

The mechanism has for its object, to wind the cloth after being woven, evenly and under pressure onto its cloth roll.

The illustration shows a side view of the mechanism, showing in solid lines, position of brackets and cloth roll when starting to wind on the cloth; the dotted lines showing the change in position of the lower brackets (one on each side) and cloth roll when the latter is filled with cloth.

O indicates a centre roll and 5 its shaft, suitably mounted in the side frames of the loom. Secured to a rail as placed on the loom frame is a stand which supports a rod 6 which forms supports for brackets 1 and 2. The outer end of brackets 1 (only one of which can be seen) is provided with a notch 7, in which is held a roller 8, and the outer end of brackets 2 is provided with a notch 9 in which is held the cloth roll 10. These two rolls are kept firmly pressed against the centre roll O by spring 4. The coth is indicated by 12 and moves in the direction of the arrow, as it is coming from the loom, passes around nearly three-fourths of the surface of centre roll O, then from the under side over roll 8, over the cross piece 3 of the top bracket 1, to and under the cross piece 13 of the lower brackets 2 and in turn onto the cloth roll 10.




As the cloth winds up onto this roll it naturally increases the size of the roll of cloth thus wound; the spring 4 exerting in turn more pressure, hence the more cloth wound on the cloth roll, the more pressure exerted.

When it is desired to remove the cloth roll the lower brackets 2 are pressed down, the roll of cloth removed, the cloth severed, a new roll placed on the brackets and the cloth again started to wind on it. A roll of any width may be used according to the width of cloth woven. *(Chas. and Wm. E. Fischer and Geo. F. Kuett, Paterson, N. J.)*

# STOP MOTIONS.

## THE FAIRMOUNT CLUTCH AND BRAKE MECHANISM.

The object of the mechanism is to stop the loom "on the pick" when necessary, permitting the brake to be removed without throwing the clutch into action, in order to permit the loom to be readily turned

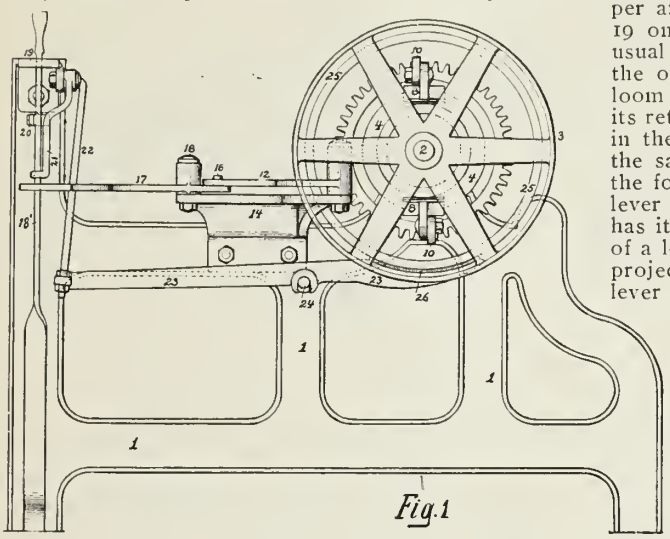


Fig.1

backward by hand for the removal of defective picks or for other purposes.

Fig. 1 is a side view of sufficient of a loom to illustrate this clutch and brake therefor. Fig. 2 is a plan view of the same. Fig. 3 is a front view with the loom frame shown in section, and Fig. 4 is a section through the clutch.

One of the side frames of the loom is represented at 1, and to bearings in said side frame is adapted the driving shaft 2 of the loom, said shaft having mounted upon its outer end, so as to turn freely thereon, a pulley 3 for receiving the driving belt. This pulley has secured to it a flaring clutch rim 4, having its outer flat face covered with leather 5, this face of the clutch rim being opposed to the similarly covered face of a disk or collar 6, which is rigidly secured to the shaft 2.

On the hub of the disk 6 is adapted to slide a grooved collar 7, engaging with the inwardly extending arms of levers 8, which are hung by means of bolts 9 to slotted brackets 10, projecting from the periphery of the disk 6.

The outwardly extending arms of the levers 8 overhang the clutch rim 4 and are shod with frictional material, so that when the grooved collar 7 is moved away from the disk 6 it will effect movement of the levers 8 in the direction of the arrows, Fig. 3, so as to press the outer arms of the same firmly against the clutch rim 4 and at the same time press the latter toward the disk 6, so that there is a double frictional hold, the first being a direct frictional contact between the adjoining faces of the clutch rim and disk and the second a frictional contact between the clutch rim and the shoes of the levers 8.

Secured to or forming part of the grooved collar 7 is another grooved collar 11, with which engage pins carried by a lever 12, hung to a stud 13 on a bracket 14, projecting from the side frame of the loom, said lever having a slot 15 for receiving a pin 16, carried by the short arm of a lever 17, hung to another stud 18 on the bracket 14, the long arm of said lever 17 being forked so as to embrace the usual spring shipper arm 18', which engages with a notched bracket 19 on the loom frame and is under control of the usual knock off lever 20, the latter being actuated by the ordinary shuttle and filling stop motions of the loom in order to press the shipper arm 18', out of its retaining notch in the bracket 19 whenever a defect in the operation of the loom requires a stoppage of the same. The shipper arm 18' is also embraced by the forked lower end of the long arm of a bell crank lever 21, which is hung to a lug on the bracket 19 and has its short arm connected by a rod 22 to one arm of a lever 23, the latter being pivoted upon a stud 24, projecting from the bracket 14. The other arm of the lever 23 is curved concentrically with the periphery of a wheel or disk 25, which is secured to the shaft 2, said curved arm of the lever 23 being provided with a leather shoe 26.

The bracket 19 has two notches 27 and 28, the latter being located outwardly beyond the notch 27, and when the loom is running the shipper arm 18' rests in the notch 27, the effect of which is to release the brake shoe 26 from contact with the periphery of the brake disk 25 and to draw the grooved collar 7 inwardly on the hub of the disk 6, so as to press the shoes of the levers 8 onto the clutch rim 4, and the latter into contact with the clutch disk 6, thereby clutching the driving pulley 3 of the shaft 2. When, however,

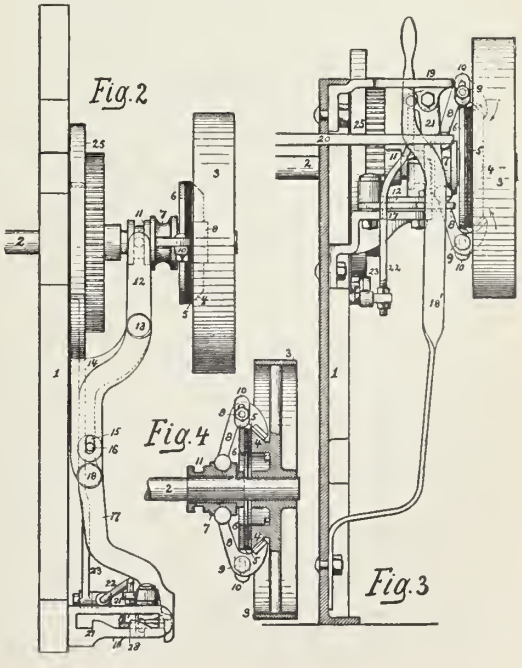


Fig.2

Fig.4

Fig.3

the knock off bar 20 is operated, it pushes the shipper arm 18′ out of the notch 27, and the spring of the arm thereupon immediately carries it to the outer end of the slot in the bracket 19, thus imparting such movement to the levers 17, 12, and 23 as to release the clutch rim 4 from the action of the levers 8 and apply the brake shoe 26 firmly to the periphery of the brake disk 25, thereby quickly stopping the loom.

If it is desired to turn the loom by hand for any purpose, the shipper arm 18′ is drawn inward until it rests in the outer notch 28 of the bracket 19, this movement being sufficient to withdraw the brake shoe 26 from contact with the brake disk 25, but not being enough to cause action of the levers 8 upon the clutch rim 4. Hence the loom will be free from the influence of the brake, but will not be clutched to the driving pulley, the latter operation requiring the movement of the shipper arm 18′ to its full inward position, where it rests in the inner notch 27 of the bracket 19.

If the driving pulley occupies a fixed longitudinal position on the shaft 2, the clutching operation can be effected by the simple engagement of the clutch rim of the pulley and the clutch levers 8, but it is more satisfactory to bring into action the additional clutching surface presented by the disk 6. *(Fairmount Machine Co.)*

## CONNECTING THE DWELL STAND TO THE LAY SWORD.

In looms, to which the improved device is to be applied, the "dwell stand" is rigidly attached at its lower end to the lay sword and pivotally attached at its upper end to the crank connector and the lay sword. When the lay protects to stop the loom, the crank shaft does not stop immediately, but pushes by means of the crank connector upon the dwell stand in an upward direction, and the dwell stand being rigidly attached to the lay sword at its lower end cannot yield, and consequently the dwell stand is now and then broken and sometimes even the lay sword.

The object of the new device is to provide relief (yielding or moving) for the lower end of the dwell stand, so that the upper end of the stand may swing or move on the pivot pin connecting it with the lay sword when the lay protects, and thus prevent the breaking of the dwell stand or of the lay sword.

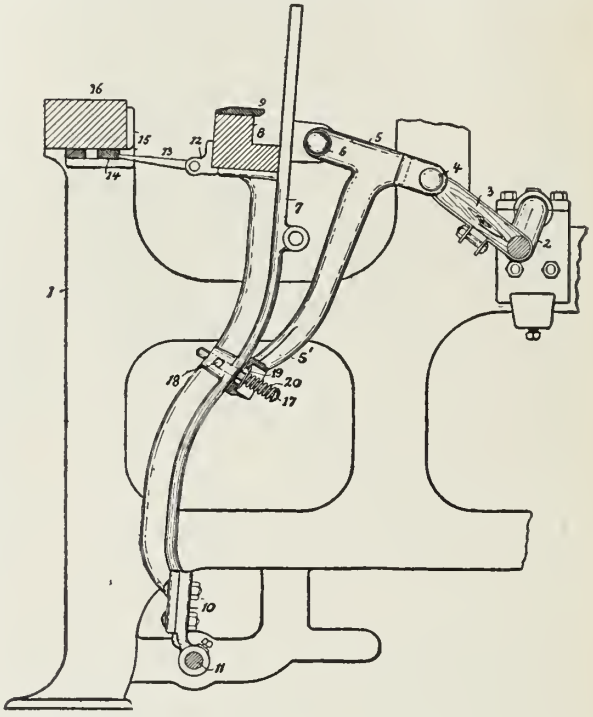
The illustration is a sectional elevation of portions of a loom with the improvements applied thereto.

1 is the loom side, 2 the crank shaft, 3 the crank connector and 4 the crank connector pin connecting the crank connector 3 with the rear upper end of the dwell stand 5, the front upper end of which is pivotally connected with the rear of the lay sword 7 by the pin 6. The lay sword 7 carries the lay 8, on which is the race plate 9, and the lay foot 10 is mounted on the rock shaft 11.

The protector rod stand 12 is secured to the lay 8 and carries the protector finger 13, which engages the bunter lever 14 on the bunter stand 15, secured to the breast beam 16 when the lay protects.

In the ordinary construction of the dwell stand 5, the lower end 5′ is made a part of or rigidly secured to the lay sword 7, but in the improved construction the lower end 5′ of the dwell stand 5 is not rigidly secured to the lay sword, but is connected therewith so as to have a movement independent of the lay sword to allow the upper forward end of the dwell stand 5 to swing or move on its pivot pin 6 when the lay protects. For this purpose the lower end 5′ of the dwell stand 5 of the lay sword 7 is yieldingly connected by means of a pin 17, which extends loosely through a hole in the lower end 5′ of the dwell stand 5 and through a hole in the lay sword and is secured to the lay sword by a set screw 18. A washer 19 is loosely mounted on the pin 17 and bears against the inner surface of the opening in the lower end 5′ of the dwell stand 5. A spiral compression spring 20 encircles the pin 17 intermediate the washer 19 and the head of the pin 17.

The spring 20 acts to hold the lower end 5′ of the dwell stand 5 against the lay sword 7 to move with said lay sword, but also allows the lower end 5′ of the




dwell stand 5 to yield and move away from the lay sword, so that the upper front end of the dwell stand 5 can swing or move on its pivot pin 6.

When the lay protects, the protector finger 13 strikes the bunter lever 14, which falls back against the stand 15. The movement of the bunter lever 14 throws off the power; but the crank shaft 2 does not stop immediately, but pushes by means of the crank connector 3 upon the dwell stand 5 in an upward direction, which causes the upper end of said dwell stand to swing or move on the pivot pin 6 and the lower end 5′ of said dwell stand to move away from the lay sword and compress the spring 20, thus relieving the sword and dwell stand from the strain which might break the sword or dwell stand. *(Crompton and Knowles Loom Works.)*

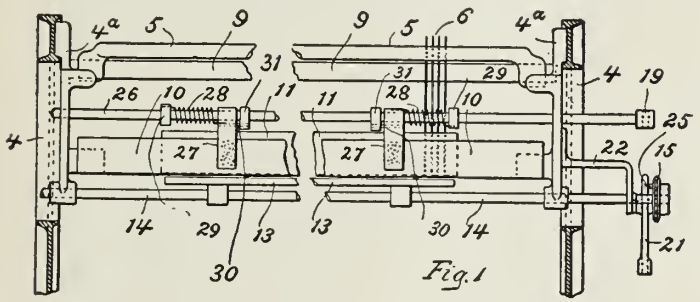
## BARDSLEY'S WARP STOP MOTION FOR COTTON LOOMS.

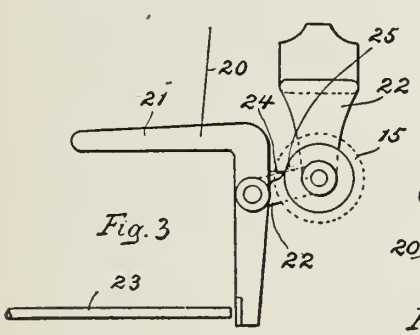
Fig. 1 is a view in vertical section of the frame work of part of a loom, having this stop motion applied thereto, showing only a few detectors. Figs. 2 and 3 are detailed views of parts of the motion, in side or end elevation, on an enlarged scale, showing certain of the parts, part of bracket $4^a$ Fig. 2 being represented as broken away in order to show more clearly certain parts.

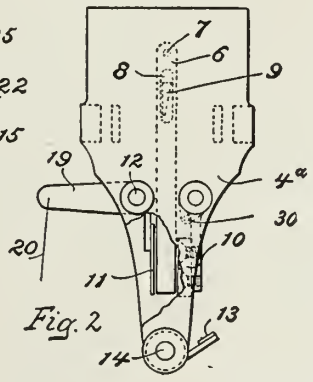
This warp stop motion is introduced in the loom between the whip roll and the lease rods.

4 designates the loom frame, 5 the warp rests, being rods extending transversely across the loom parallel to each other at a short distance apart and carried by brackets $4^a$ placed between the whip roll and the lease rods. Between the warp rests 5 is arranged a series of detectors 6, composed of a flat metallic strip which is formed with an eye 7, for the passage of a warp thread and with a vertically elongated slot 8, to enable the detectors to be threaded side by side upon a sustaining rod 9, which latter extends transversely across the loom between the warp rests 5 and like the latter has its opposite ends applied to supports $4^a$.

10 designates a guiding strip employed at the rear of the series of detectors for holding their lower ends




in proper alignment. At the front of the series of detectors is located a plate 11 which is fast with the transversely extending shaft 12, the latter being mounted to turn in the brackets $4^a$. For coaction with the lower ends of the detectors 6 a feeler 13 is provided, consisting of a wing fixedly connected with shaft 14, extending transversely across the loom and mounted to turn in its supports. To the shaft 14 movement is communicated to cause the feeler 13 to feel for the lower end of any detector which may have been permitted by the breakage or slackening of the corresponding warp thread to descend into the path of movement of the said feeler. The feeler shaft 14 is arranged to be rotated by means of sprocket wheel 15, fast thereon and receiving a chain, actuated by means of a sprocket wheel on the cam shaft of the loom. When the feeler 13 in its movement encounters the lower end of a dropped detector, it presses the said end forward, carrying with it the movable plate 11.

In order to permit of the detectors being pressed forward at their lower ends, the rear side of the supporting strip 9 is beveled off from the upper edge thereof downwardly.

The movement which is communicated to the movable plate 11, in the manner which has been described, is utilized for effecting the stoppage of the loom thus: An arm 19 is connected operatively with the movable plate 11, the said arm being made fast upon shaft 12, which carries plate 11. The arm 19 is connected by a coupling 20 with lever 21, hung to arm 22, that is applied to the support $4^a$ for one end of the shaft 14. The lower end of the said lever 21 is disposed in line with one end of a horizontally movable knocking off rod 23, its forward end acting on the shipper rod to stop the loom. The movement which is given to the lever 21 when the plate 11 is actuated, brings the lever 21 within the range of action, of a moving device, termed a "striker," in order that the said lever 21 may be actuated positively by the said striker in such manner as to occasion an endwise movement of the knocking off rod 23, and thus stop the loom. The mechanism to accomplish this is clearly shown in Fig. 3, the lever 21 being provided with a toe 24, to be engaged by the striker, and the latter being a pin 25, projecting from the side of the sprocket wheel 15, upon the feeler shaft 14. When, therefore, the lever 21 is turned upon its pivot in consequence of a detector in its fallen position being pressed laterally by the feeler 13 against the plate 11, the toe 24 on the lever 21 is brought into the range of movement of the striker 25 and is thereupon encountered by the said striker, with the result that the lever 21 is turned positively about its pivot, so as to push the knocking off rod 23 endwise and effect the stopping of the loom.

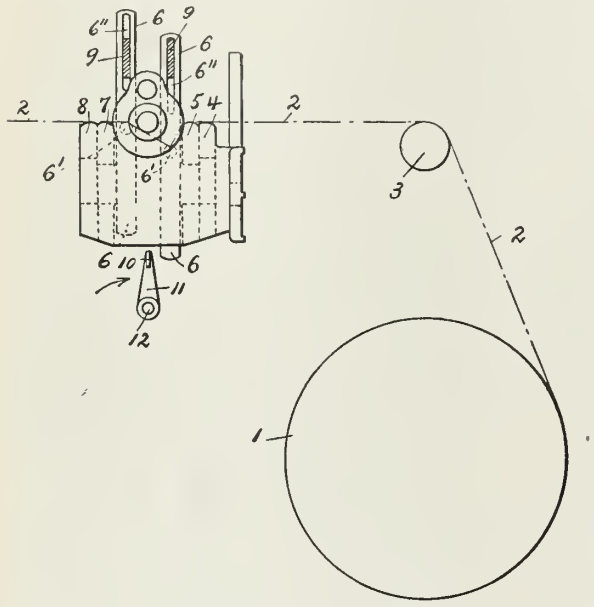
The back blade or strip 10 at the rear of the detectors is mounted in a manner which enables the same to yield in case the loom is turned backward by hand at a time when a detector is occupying its lowest position. Thus when the feeler 13 is carried backwardly against said depressed detector, so that it bears the latter rearwardly against the guiding strip 10, the latter yields and thereby avoids breakage of parts and other trouble. The guiding strip 10 is hung loosely on the shaft 26, by means of plates 27, which are made fast to the said guiding strip and formed with holes therethrough to enable them to be fitted loosely on said rod or shaft 26. A spring 28, surrounding shaft 26 and having one end thereof engaged with a collar 29, fixed on the shaft, and the other end thereof engaged with one of the plates 27, operates to press the guiding strip 10 forward into its normal working position, the latter being determined by means of a stop pin 30, projecting from a collar 31, fast on shaft 26. *(Crompton and Knowles Loom Works.)*

## ARTHUR'S WARP STOP MOTION FOR COTTON LOOMS.

In these warp stop motions as located back of the harnesses and in which the detectors are operated independent of the shedding mechanism, dirt and lint will more or less collect upon the guide bars and in the slots of the detectors through which the guide bars pass so as to encumber the operation of the motion and require the loom to be occasionally stopped and the dirt and lint removed from the slots of the detectors.

To overcome this difficulty, the guide bars are placed in the new motion above the warp and out of the way of the falling dirt, the detectors having an elongated slot near their upper ends for the guide bar

to pass through and support the detectors in position, and an opening below the slot for the passage of the warp threads, with an elongated portion below the opening. The guide bars are flat so as to support and guide the detectors in position, and are supported by stands carried on the frame of the loom. Below the guide bars, at each side of the detectors is placed a supporting bar for the warp threads to rest upon,




holding all of the detectors supported normally approximately in the plane of the warp. These warp supporting bars are adjacent to the sides of the detectors, but with a free space between them to allow of the ready removal of dirt and lint which may collect during the process of weaving. By this arrangement of guide bar, detectors and warp supporting bar an uninterrupted space is left between the detectors and the warp supporting bar.

1 indicates the warp beam, 2 the warp threads passing from said beam over the back roll 3 and over the supporting bars 4 and 5, upon which the warp threads rest, and through openings 6′ in the detectors 6, and then over the front supporting bars 7 and 8 to the harnesses. The edges of the detectors 6 are not contiguous to the edges or sides of the supporting bars 5 and 7, but are parallel and adjacent thereto, and a space of more or less width is left between the adjacent edges.

The detectors 6, for which there is one for each warp thread, have at their upper ends, elongated slots 6″ through which the stationary transverse flattened guide bars 9 extend over the warp threads and from one side of the warp to the other.

The stationary transverse bars 9 are flattened and about half the width in a vertical plane of the length of the slots 6″ in the detectors 6, in turn of which said bars 9 will guide and direct the movement in a vertical plane of each of the detectors and hold them in their proper positions at their lower ends, so that they will be engaged by the knife 10. At the same time the bars 9 support the detectors when the warp threads break and limit their downward movement.

The normal position of the detectors 6, is that shown at the left in the illustration, the detectors being held up by the warp threads passing through the holes 6′ therein.

In case of the breaking of a warp thread the detector with which the warp thread is connected drops down by gravity to the position shown at the right in the illustration, guided by the bar 9, and the lower end of the detector extends in the path of the knife 10, which extends transversely across the loom from one side of the warp to the other and is supported on arms 11, fast on rock shaft 12 connected with the shipper device of the loom to stop the loom in case the blade 10 engages with the detector 6.

An improvement on the thus described device consists in providing a different construction of the detector, the object being to prevent any chance of bending or twisting of the same.

Two constructions of this new detector are shown. Referring to the construction shown in Fig. 1, *a* indicates two detectors, one of each series, said detectors being notched, as at *b* to be engaged by the feeler *c* which is of substantially the same shape and size as the notch in the detector, but of a rather more obtuse angle than that of said notch, so that the engaging surface of the feeler will wedge into the notch and act to firmly hold the lower end of the detector in the direction of its width without any downward pressure thereon. In the illustration one of the detectors is shown in its dropped position, its notch being in engagement with the feeler, the detector thus being firmly held or wedged against its supporting bar *d* thus preventing any bending or twisting of the detector.

Referring to the construction shown in Fig. 2, the detector *a* is made with a straight edge where it is engaged by feeler *c*, having at its opposite edge next to the supporting bar *d*, an angular notch *b* therein, to receive a projection on the inner side of the supporting bar *d*, as shown, when the detector *a* is in its lowered position and engaged by the feeler *c*. This projection on the supporting bar *d* is angular, with a more obtuse angle than the angle of the notch in the detector *a*, as shown, so that the engagement of the feeler *c* with the detector *a* will crowd the notch in the detector onto the projection on the supporting

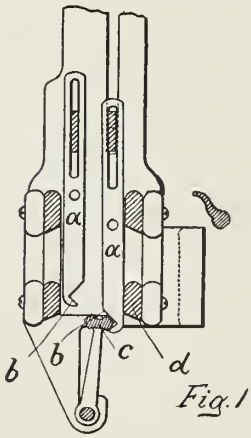



Fig. 1

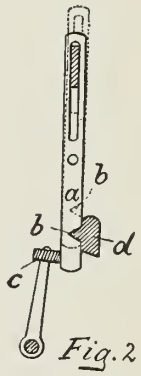



Fig. 2

bar and cause the detector to be firmly held or wedged and thus prevented from bending or twisting. *(Crompton and Knowles Loom Works.)*

## STOP MECHANISM FOR DRAPER COTTON LOOMS.

The object is to automatically stop the loom when the shuttle is not properly boxed, the shuttle box being provided with a front binder operating with the frog device of the protector mechanism.

Fig. 1 is a front elevation, centrally broken out, of a lay and the parts carried thereby to illustrate the new mechanism; and Fig. 2 is a transverse sectional view thereof on the line $x$-$x$, the breast beam, protector mechanism, and a portion of the loom frame being shown.

A indicates one of the sides of the loom, A' the breast beam, having the notched holding plate $A^x$ for the shipper handle S, and the knock off arm $a$, fulcrumed at $a'$ and having a depending finger $a^2$, actuated by the slide block or frog carrier $a^3$.

The main crank shaft C has fast thereon a fly wheel C', adjacent to which is mounted a brake shoe $C^2$, pivoted on the loom side, the shoe having a projection D, to which is secured a brake rod $C^3$, slotted at its front end at $C^4$ to embrace a stud $e$ on the slide block $a^3$.

B indicates the lay having shuttle box backs B', and being provided with front binders $B^2$, pivotally mounted on the lay at $B^3$. $B^4$ are stops, attached to the lay at the entrance of the shuttle boxes, limiting the inward movement of the binders. Bearings $b^x$ are secured to the lay to receive a two part rock shaft $d$ $d'$, connected by a coupling $d^x$, the outer ends of the parts being bent up to form binder fingers $d^2$, $d^4$, which are held against the binders $B^2$ by a spring $S^x$, attached at one end to the rock shaft and at its other end to the lay. Near one end of the lay, at the side of the loom adjacent the shipper lever, attached to the rock shaft is a hook like dagger $d^5$, extended rearwardly below the lay and adapted at times to engage the notched part or frog $a^5$ of the slide block $a^3$, to thereby move the latter forward as the lay beats up and effect the release of the shipper lever from its holding notch, bringing the protector mechanism into

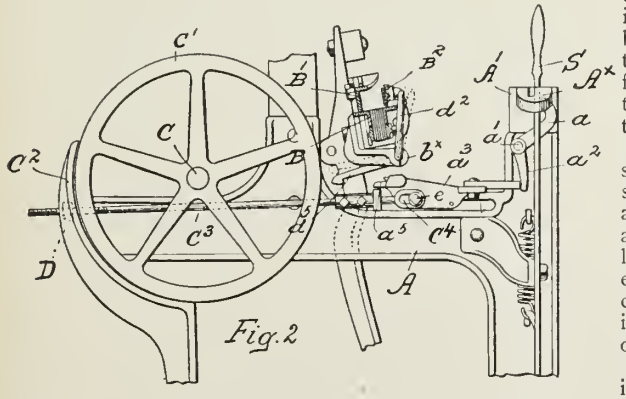


Fig. 2

operation. Such movement of the slide block acts through the rod $C^3$ to move the brake shoe $C^2$ into engagement with the fly wheel to effect the stoppage of the crank shaft, the momentum of the lay being thus utilized to apply the brake whenever the protector mechanism operates.

The spring $S^x$ presses the front binders inward, and the hook $d^5$ is then in position to engage and move the block $a^5$ as the lay beats up; but if the shuttle is properly boxed the binder will be pressed outward, rocking the shaft $d$, $d'$ and lifting the hook into the dotted line inoperative position shown in Fig. 2. If the shuttle is improperly boxed, the binder will not be moved outward and the hook $d^5$ will operate the protector mechanism and stop the loom. *(Draper Co.)*

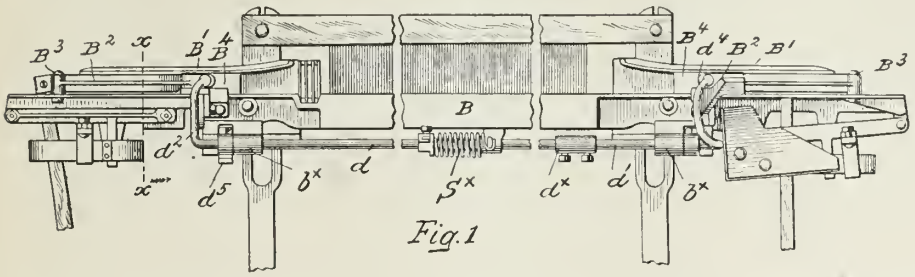


Fig. 1

## FILLING STOP MOTION FOR NORTHROP LOOMS.

The mechanism has for its objects the production of means for controlling the filling supplying mechanism on plain work through two different and independent sets of devices, the one operative upon failure of the filling and the other operative upon the exhaustion of the filling in the shuttle to a predetermined extent.

Stopping means are provided which are automatically operated upon a second failure of filling to thereby stop the loom, whereas if the filling supplying mechanism is actuated upon the exhaustion of the filling to a predetermined extent said stopping means being held inoperative unless a mispick should occur.

The illustration is a perspective view of the left hand end of the breast beam and the lay of a loom, having the new mechanism applied thereto, the lay being shown as having nearly reached its rearmost position.

The front plate $A^2$ of the shuttle box at the left hand end of the lay $A^3$ is provided with an upturned bracket $b$, on which is pivotally mounted a feeler carrier, shown as an arm $b'$, extended longitudinally in the direction of the length of the lay and weighted at its outer end at $b^2$, the opposite or inner end of the arm being bent to form a dog $b^3$, while the weighted end of the feeler carrier has attached thereto the filling feeler $b^x$, shown as a substantially ∩-shaped member, the free end of which is enlarged to rest upon the filling $f$ in the shuttle S when the latter is in the shuttle box. As the diameter of the mass of filling decreases the filling feeler will at each beat up of the lay extend further in toward the longitudinal center of the shuttle due to the weighted end $b^2$ of the feeler carrier, and thereby the opposite end or dog $b^3$ is elevated.

To remove the filling feeler from the path of the shuttle as the latter is thrown, a lifter is provided, shown as a cam $b^4$, formed on the outer end of an arm $b^5$, rigidly secured to the frame A of the loom and extended forwardly in such position that as the lay goes back, the lifter $b^4$ passes beneath the weighted end of the feeler carrier, and the inclined face of the cam will lift said arm and the feeler as the lay reaches its rearmost position, so that the feeler is entirely out of the way of the shuttle.

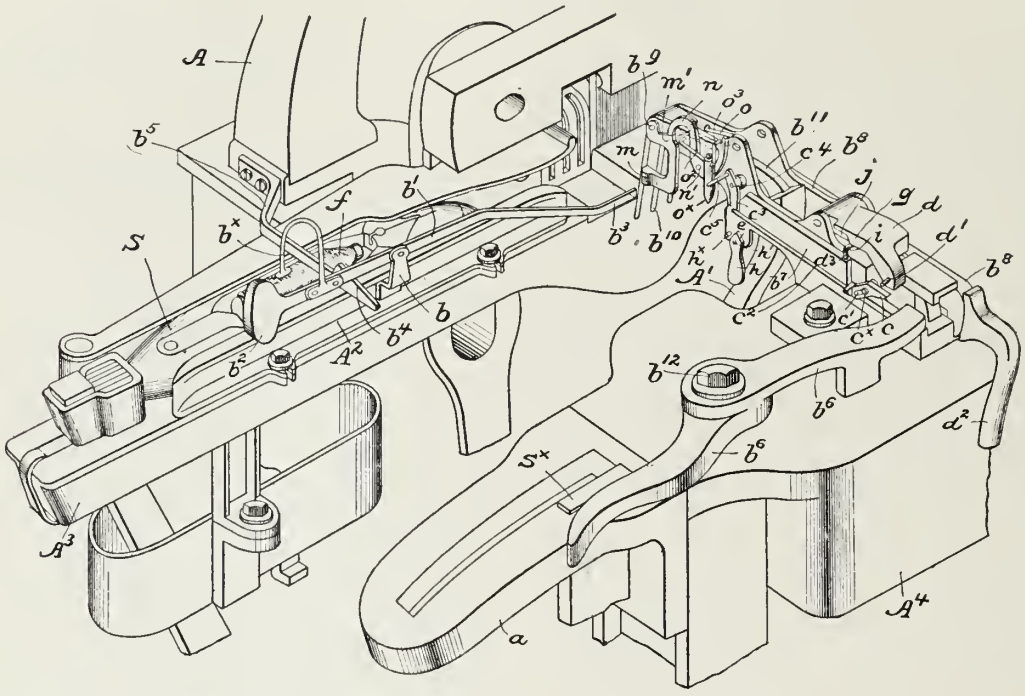
The shipper handle $S^x$ moves in the notched holding plate $a$, and a knock off lever $b^6$, which normally rests against or adjacent the shipper handle, is pivoted to the breast beam at $b^{12}$, the free end of the lever being acted upon by the filling fork mechanism when it is desired to release the shipper handle and thereby stop the loom.

The filling fork mechanism comprises a stand $b^7$, mounted on the breast beam $A^4$ and provided with a guideway, in which a slide $b^8$ is adapted to reciprocate, said slide having pivoted at $b^9$ a filling fork $b^{10}$, the fork having a rearwardly projecting tail, adapted to be engaged by a hook $b^{11}$, pivotally mounted on the upper end of the slide actuator or filling hammer A' when the filling is absent as the lay beats up. A latch $d$ is pivoted on the slide $b^8$, said latch having on its under side a cam $g$, the free downturned end of the latch being adapted to at times operate the knock off lever $b^6$, a pin or stud $d^3$, mounted on the stand $b^7$, having its upper end inturned, as at $i$ to extend beneath and coöperate with the latch cam $g$. Back of the cam $g$ the latch is recessed in its side, as at $j$, to receive the inturned end $i$ of the pin $d^3$ when the slide $b^8$ has been moved outwardly.

On the outer side of the slide $b^8$ is mounted a rocking bunter $m$, pivoted on the filling fork pivot $b^9$, said bunter having a forwardly extended finger $m'$, which is normally held by the weight of the depending bunter against one end of an **S**-shaped arm or detent $n$, pivoted at $n'$ on the slide, the other upturned end of the detent being notched or recessed to form a shoulder.

The tail of the filling fork forms one connection between the filling hammer A' and the slide $b^8$, the position of said tail or connection being determined by the presence or absence of filling in the shed as the lay comes forward. In addition to this connection an independent connection between the slide and the filling fork is provided, shown as an outwardly extended loop like catch $o$ of stout wire, with its ends outturned to form pivots, which enter holes in the slide, the catch $o$ being made wide enough to prevent interference with the tail of the filling fork. One pivot end of the catch is extended beyond the side of the slide and is bent forward to form an arm $o^2$ outside of the **S**-shaped detent $n$, said arm at its free end being upturned and bent inward, as at $o^3$, to be normally engaged by the shoulder of the detent. A weight $o^x$ is secured to the arm $o^2$ near its free end to prevent disengagement of the end of said arm and the detent by the jarring of the loom or other accidental cause.

The lower extremity of the bunter $m$ is normally above the path of movement of the dog $b^3$ as the latter comes forward when the lay beats up; but as the filling in the shuttle diminishes the dog is gradually elevated until when the filling has been exhausted to a predetermined amount the said dog will be elevated sufficiently to engage the depending end of the bunter on the forward movement of the lay, swinging the bunter to the right, and thereby rocking the **S**-shaped detent $n$ to withdraw its shoulder from the overhanging part $o^3$ of the catch $o$. This disengagement permits the weight $o^x$ to drop, and thereby turns the catch $o$ on its pivot into position to be engaged by the hook of the filling hammer or actuator, so that on the next outward movement of the latter the slide $b^8$ will be moved outwardly, and its outer end will at such time engage an upturned arm $d^2$, fast on a rock shaft, turning the latter sufficiently to operate the filling supplying mechanism to thereby insert a fresh supply of filling into the shuttle before complete exhaustion of the filling then in the shuttle.




When the shuttle enters the box at the right hand end of the lay, the feeler will dip down in the empty shuttle box sufficiently to raise the dog above the depending end of the bunter $m$, the said bunter being rearwardly curved to leave a clear space between its pivotal point and its depending end, so that when the dog is elevated by the descent of the filling feeler into the empty shuttle box said dog will enter the clear space between the ends of the bunter and will not engage the latter.

When the filling fails, however, the fork $b^{10}$ will not be tilted, and its tail will be engaged by the hook of the actuator A' to thereby move the fork slide outwardly, such outward movement of the slide disengaging the cam $g$ of the latch $d$ from the end $i$ of the stud or pin $d^3$, and the latch will drop behind the knock off lever $b^6$ and stop the loom before there has been a thin place or streak made in the cloth. On the inward movement of the slide the cam $g$ rides up over

the end $i$ of the pin, and thus raises the latch into normal position.

When the filling feeler is made operative to effect a change of filling, the loom must not be stopped unless there be a mispick, and in the latter case the filling will not be laid in the shed, and the filling fork will then operate as before described, and the loom will be stopped before the formation of a thin place in the cloth. It is thus necessary to prevent stopping of the loom on the outward movement of the slide $b^3$ when the filling supplying mechanism is operated by or through the feeler governed mechanism, and to prevent such stoppage a trip is provided to engage and prevent movement of the latch $d$ into operative position, so that instead of stopping the loom on the outward movement of the fork slide the filling supplying mechanism will be operated.

The latch $d$ is provided with a laterally extended pin $d'$, adapted to be engaged by the trip $c$, being a plate mounted on the side of the slide $b^3$ by means of a headed pin $c^x$, extending through an inclined slot $c'$ in the plate, so that when the latter is moved it will also move upwardly and into position to engage the stud $d'$, to thereby prevent the outer end of the latch from descending sufficiently to engage the knock off lever $b^6$. The trip $c$ is connected by a link $c^2$ with a bell crank lever $c^3$, pivoted at $c^4$ on the slide $b^3$, the opposite arm of said lever being connected by a link $c^5$ with the depending weight $o^x$ on the arm $o^2$ of the catch. When the catch $o$ is released, as has been described, and swings downward, the bell crank lever is swung on its pivot to move the link $c^2$ in a direction so as to thereby move the trip into the operative position described. Means are provided to automatically set the catch $o$ after it has been released by the detent, said setting device being a weighted arm $h$, pivoted at $h'$ to the slide stand $b^7$, and having its upper end oppositely beveled as at $e$.

Supposing the catch to have been released, the weight $o^x$ will wipe over the upper end of the arm $h$ on the outward movement of the slide, rocking said arm to permit such passage; but on the return or inward movement of the slide the rocking of the arm $h$ is limited by a pin $h^x$, so that the weight must ride up over the beveled end of the arm, and as it is so lifted it restores the part $o^3$ of the catch to its position on the shoulder of the detent.

If the fresh supply of filling is placed in the shuttle upon the exhaustion of the previous supply of filling to a predetermined extent the filling fork will operate should there be a mispick, and the loom will be stopped by the outward movement of the slide, as the trip $c$ is then in normal position, just as is the case when a filling fails.

Neither set of devices for governing the controlling means for the filling supplying mechanism interferes with the other, but each operates properly within its own bounds. *(Draper Co.)*

## STOP MOTION FOR NORTHROP LOOMS FOR WEAVING BLANKETS, ETC.

The object of the motion is to stop the loom, in weaving blankets or other goods having one or more stripes inserted by hand, at certain intervals at the proper time without depending upon the weaver, since he has a number of looms to attend to and thus may fail to properly note the appearance of the cut mark in the cloth. This motion also prevents the starting up of the loom after a stoppage unless the weaver fully understands the cause of the stoppage, since in looms provided with warp stop motion mechanism, which acts to stop the loom upon breakage of a warp thread, it is desirable for the weaver to know at once what caused the stoppage. Another object is to automatically stop the loom at the end of each cut of a certain number of yards, so that the weaver can insert the "heading."

Fig. 1 is a front elevation of a portion of a loom, with the motion applied thereto. Figs. 2 and 3 are enlarged plan views compared to Fig. 1 of the controlling means for the stopping mechanism.

A indicates the breast beam, $A^1$ the holding plate notched for the shipper handle S. $a$ is the knock off arm which is connected with the stopping means for the loom, filling or warp controlled, or both.

The take up mechanism shown in illustrations includes the rachet wheel $B^x$, the shaft of which is connected by a pinion $b$ with the gear $b^1$ of the cloth winding roll B and by the intermediate gears $b^2$, $b^3$, with the large gear $B^1$, which drives the breast roll $B^2$. A knock off lever $c$ is pivoted to the breast beam, said knock off lever having one end $c^2$ adapted to be at times moved against the shipper handle S by a spring $s$.

When the loom is running the knock off lever is normally held in inoperative position by a detent $d$, formed by the upper end of a slide rod, which is supported by the breast beam and by a bearing $d^x$ for its lower end. (Shown as an ear on a bracket D, attached to the loom side $A^x$.)

A spring $s^x$, surrounding the detent rod $d$ between the bearing $d^x$ and a collar $d^1$ on the rod, acts normally to elevate the latter, and maintain its upper end in the path of the lever $c$, preventing operation thereof.

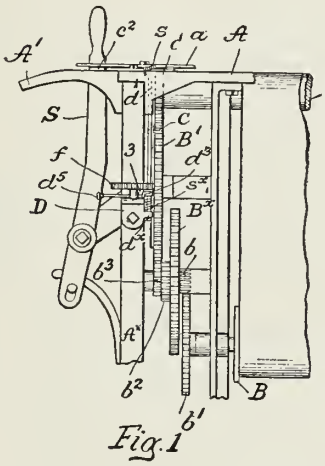


Fig. 1

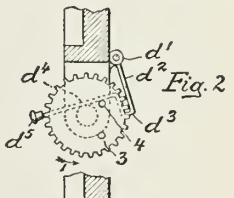


Fig. 2

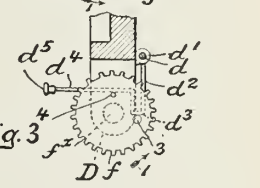


Fig. 3

The collar $d^1$ has fast upon it a laterally extended arm $d^2$, bent back upon itself at $d^3$, and then down and outward at $d^4$ at right angles to the part $d^2$, and provided with a knob or handle $d^5$. This bent arm is extended beneath the lower face of a controlling gear $f$, mounted to rotate on a stud $f^x$ on the bracket D, and the teeth of this gear are engaged by a cam C (herein shown as attached to the adjacent side of the large gear $B^1$), and herein said cam is arranged to rotate the controlling gear $f$ step by step one tooth at a time for every revolution of the large gear $B^1$. Depending from said controlling gear two pins 3 and 4 are arranged, the former having a beveled end and moves in such a circular path as will cause it to engage the bend $d^3$ of the arm $d^2$ when the latter is in the position shown in Fig. 3, the controlling gear $f$ rotating in the direction of the arrow 1. The other stud or pin 4 is nearer the center of the gear $f$, and serves to engage the extension $d^4$ of the arm $d^2$ in the rotation of said gear, as shown in Fig.

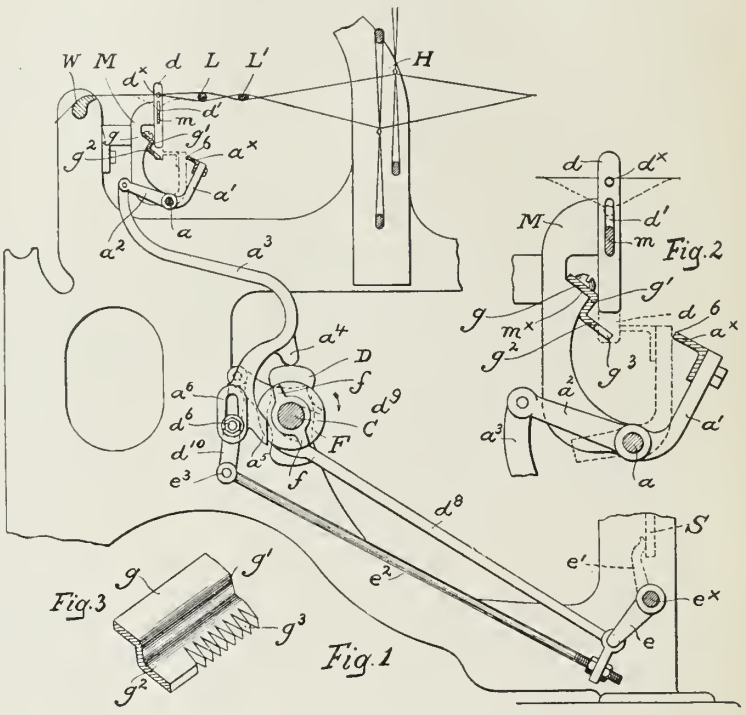
2 further rotation of the controlling gear causing the stud 4 to swing the arm into the position, shown in Fig. 3, with the bend $d^3$ in the path of the stud 3.

In Fig. 3 the parts are in position ready to operate to stop the loom. Supposing that the take up mechanism has wound up a certain length of cloth and a stripe is to be inserted by hand, the next advance of controlling gear $f$ will cause the beveled end of the stud 3 to ride up on to the bend $d^3$, depressing the arm $d^2$ and detent $d$ against the spring $s^x$ and withdrawing the detent from in front of the knock off lever $c$. The latter when thus released will be swung by its spring $s$ to move the shipper handle S from its holding notch, the tip or finger $c^2$ of the said lever moving into position behind the shipper handle, so that the latter cannot be returned to running position until the tip is withdrawn. A fixed stop fixed to the plate of the breast beam A limits the spring actuated movement of the knock off lever. The bent arm $d^2$ thus serves as a trip to withdraw the detent $d$ from the knock off lever when acted upon by the stud 3, and the spring $s^x$ may act to partially rotate the rod $d$ to move the trip into position shown in Fig. 2, or it may be moved by hand when the loom is to be started.

After the weaver has inserted the stripe he swings the knock off lever $c$ into normal position, withdrawing the tip from behind the shipper handle S, so that the latter can be moved into running position to start the loom.

Should the cut marks not come absolutely even, it may be necessary for the weaver to liberate the knock off lever and run the loom a few picks till the proper time for the stripe comes. In such case the knock off will serve as an alarm to prepare the weaver for the coming cut mark.

When the knock off lever is moved into normal position, it passes off the top of the detent $d$ and the spring $s^x$ immediately lifts the latter to retain the said lever in position. Now the controlling gear $f$ resumes its step by step rotation, and the short stud 3 moves around without engaging the outturned part $d^4$ of the trip, and the latter will remain at rest until the longer stud 4 again moves into position to engage the part $d^4$ of the trip and move the bend $d^3$ of the latter into the path of the stud 3, when the operation before described is repeated. *(Draper Co.)*




The detectors $d$ located back of the lease rods, are thin metal plates provided each with a warp eye $d^x$ and with a longitudinal slot $d'$, located below the warp receiving eye, the said slots of the detectors receiving a transverse bar $m$, extended across the loom and mounted in brackets M, attached to the loom side. This bar $m$ serves as a stop to limit the descent of a released detector and also to guide said detectors when maintained in inoperative or elevated position by normal warp threads as shown in full lines, Figs. 1 and 2.

A rock shaft $a$ is mounted in bearings on the lower part of the brackets M, said rock shaft having arms $a'$, to which a feeler $a^x$ is attached, the feeler being an angle bar with its continuous longitudinal edge 6 turned toward the detectors, the feeler normally vibrating back and forth below the lower ends of the detectors.

Opposite to the path of movement of the feeler is mounted the director, being a plate $g$, mounted on the inclined seats $m^x$ of the brackets M and bent to form a shoulder $g'$ extended longitudinally along the rear upright edges of the series of detectors, the plate being again bent below the shoulder to form an inclined shelf like portion $g^2$, having its edge deeply serrated or notched to form a series of bevel sided teeth $g^3$. The toothed part of the shelf $g^2$ extends below the vertical path of movement of the detectors, so that when one of the latter is released by failure or slackness of its warp thread it will descend into dotted line position (best shown in Fig. 2) between two of the teeth of the shelf, and in such position it will engage and arrest the feeler as the latter moves rearwardly or toward the detectors. At the time of engagement the shoulder $g'$, acting in conjunction with the bottom of the space between the two adjacent teeth, forms a back rest for that upright edge of the detector opposite the edge engaging the feeler.

The teeth between which the released detector stands prevent twisting or bending of the detectors

## DRAPER'S WARP STOP MOTION FOR COTTON LOOMS.

Fig. 1 is a longitudinal sectional view of a sufficient portion of a loom to be understood with the device applied thereto. Fig. 2 is an enlarged detail of part of the mechanism illustrated in Fig. 1, given to more clearly show the action of the feeler upon the detector. Fig. 3 is an enlarged perspective detail of a part of the director.

H indicates the harnesses, W the whip bar or roll, L L' the lease rods, and S the shipper lever.

when engaged by the feeler and the shelf $g^2$ is inclined, to aid in directing the lower end of a released detector toward the toothed edge of the shelf to enter between two of the teeth thereof.

Under normal conditions the lower ends of the detectors project below the shoulder $g'$, the shoulder thus serving at all times as a guide for the detectors.

The feeler is moved toward the detectors in such manner that arrest of the feeler is permitted without strain or anv tendency of the parts to breakage, the reverse swing of the feeler being effected positively.

The rock shaft $a$ is provided with an arm $a^2$, extending oppositely to the feeler, and having pivotally connected to it a bent arm $a^3$, provided with a bunter $a^5$ and a toe $a^4$, the latter coöperating with the cam D on the cam shaft C of the loom, the bunter $a^5$ being thereby moved into and out of the path of one or more tappets $f$ of a cam F, also fast on the shaft C.

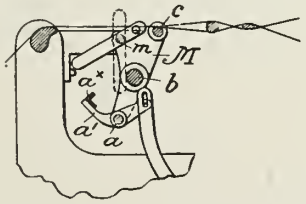
Upon arrest of the feeler the bunter $a^5$ will be held up in the path of a tappet, engagement therewith acting to swing the arm $a^3$ to the rear. The arm $a^3$ is slotted at $a^6$ to receive a stud $d^6$ on a short lever $d^{10}$, pivoted at its upper end to a link $d^8$, hooked around the cam shaft at $d^9$, while the other end of the link is jointed to the arm $e$ of a rock shaft $e^x$. This rock shaft is provided with a knock off arm $e'$ for the shipper lever, the lower end of the lever $d^{10}$ and the arm $e$ being connected by a rod $c^2$, the joint $c^3$ of which acts as the fulcrum for the lever $d^{10}$ when the bunter $a^5$ is acted upon by the tappet cam F, the swing of the upper end of said lever at such time moving the link $d^8$ longitudinally to operate the knock off arm and release the shipper handle S. *(Draper Co.)*

## DRAPER'S DETECTOR FOR WARP STOP MOTIONS.

This detector refers to warp stop motions for Draper looms and has for its object to indicate to the weaver the location of a broken warp thread, at the same time providing a detector more readily accessible for rethreading to the weaver.

The illustration clearly explains the construction and working of this detector, showing the same in both positions, viz.: full lines show normal position, dotted lines show operative position of said detector.

The device consists of brackets M, (one on each side of the loom) attached to the loom frame, and which support a rod $m$ which extends across the loom, said




rod forming a support for the detectors which swing on the rod $m$. The bracket also supports a rod $c$ which forms a warp rest, a rod $b$ which forms a back stop for the detectors, and a rock shaft $a$, to which the arm $a'$ carrying the feeler $a^x$ is attached.

When a detector is released its warp engaging end swings up above the plane of the warp threads, as is clearly shown by dotted line position of detector in the illustration, thus indicating the location of the broken end to the weaver.

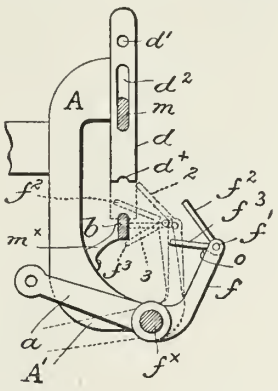
The mechanism for stopping the loom is the same as explained in the preceding article. *(Draper Co.)*

## ALLEN'S FEELER FOR WARP STOP MOTIONS.

This feeler, when the detector assumes its operative position, directs a bunter against a stop and by suitable connections arrests the running of the loom.

A is one of the stands (one for each side of the loom) which carry the new detectors, stop, feeler, bunter and its coöperating parts, and which stand A by means of a bracket (shown broken away) is fastened to the rear stand of the loom frame.

This stand A has a depending arm $A^1$, to which is pivoted on the shaft $f^x$ the upturned arm $a$, which, at its upturned end $f$, receives the journals $f^1$ of a light




but strong sheet metal plate $f^2$, called the feeler, extending upwardly from the arms $f$ and toward the detectors $d$, bunters $f^3$ being secured to the plate $f^2$ at an acute angle thereto, stop shoulders $o$ on the arms $f$ engaging the bunters and maintaining them and the feeler member $f^2$ normally in the position shown in full lines in our illustration, relatively to the rocker arms $f$.

The stand $A^1$ also has attached to it below the detector $d$ a bracket $m^x$, on which is mounted a stop $b$.

The detectors $d$ are made of thin flat strips of strong sheet metal, having two apertures, one $d^1$ for receiving the warp thread, the other $d^2$ for receiving the guide bar $m$. The detectors are also notched at $d^x$, said notch resting on the stop $b$ when the detector is in operation, *i. e.*, dropped.

The stop $o$ on the bent arm $f$ holds the feeler and bunter in the position shown in full lines in the illustration; thus, when the arm $f$ moves toward the stop $b$ the bunter will pass below said stop, as shown in dotted lines $f^3$, and the feeler will pass above it, as shown in dotted lines $f^2$, but when a detector assumes its operative position the feeler $f^2$ will, on its rearward stroke, engage the edge of the detector and will be tipped on its journals $f^1$ into the position shown in dotted lines at 2, thus bringing the bunter in the position shown at 3, and thus engaging the stop $b$, in turn directing the stopping of the loom.

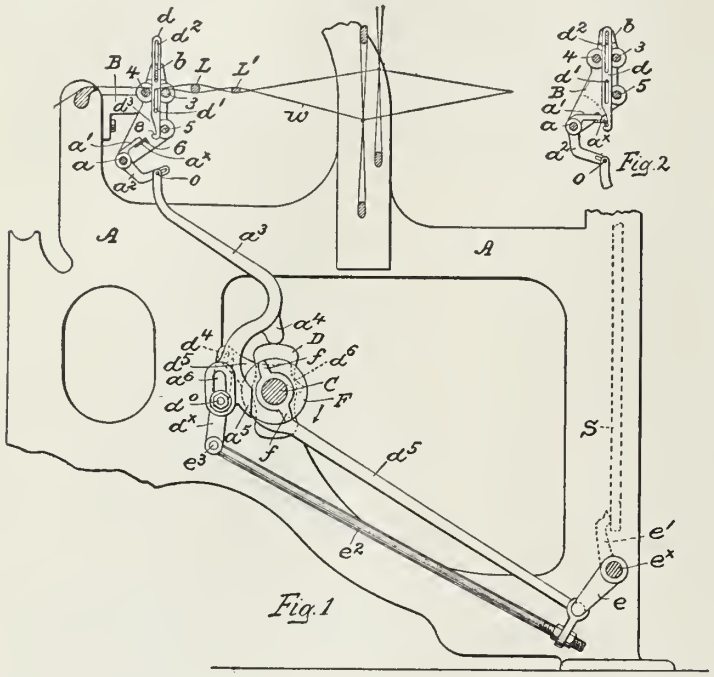
The only strain brought upon the detector is that sufficient to tip the feeler member and bring the bunter into operative position to engage the stop $b$, the stop and the bunter thus bearing all of the strain required to arrest the movement of the arms $f$ and the connected parts. *(Draper Co.)*

## NORTHROP'S WARP STOP MOTION.

Fig. 1 is a longitudinal sectional view of a part of a loom having the mechanism applied thereto. Fig. 2 is a detail showing an abnormally positioned detector.

Examining illustration Fig. 1 we find a series of

warp stop motion controlling or actuating detectors $d$ located back of the lease rods L L'. Each detector $d$ is provided with a thread receiving opening $d'$ and an elongated slot $d^2$ near its upper end; a flat bar $b$, set on edge, being extended through the slots $d^2$ and







rigidly secured to stands B, attached to the loom frame A. Two rods 3, 4, extend across the loom in front of and back of the detectors and serve as warp rests for the warp threads $w$, while a guide rod and back stop 5 extend in front of the detectors, near their lower ends. The brackets B have bearings for a rock shaft $a$, provided with arms $a'$, to which a feeler $a^x$ is attached, shown as an angle iron having a continuous edge 6 toward the detectors, the path of movement of the feeler being normally below the lower ends of the detectors, which are held by unbroken and taut warp threads in the position shown in Fig. 1.

Each detector is notched at one edge, as at $d^3$, near its lower end, the notches of the detectors being located at the edges toward the feeler, and when a thread fails or becomes unduly slack its detector moves into the position shown in Fig. 2, being supported by the bar $b$. When in such abnormal position, the forward and downward movement of the feeler causes it to enter the notch of and engage the detector on the shoulder formed by the transverse bottom or stop portion 8 of the notch, the feeler being stopped in its movement by such engagement. As the forward and downward movement of the feeler is due to gravity, the strain of the stoppage is brought upon the detector through the stop 8; such strain is tensile, being resisted by the supporting bar $b$, extended through the said detectors, inasmuch as the strain is substantially in the direction of a tangent to the arc described by the feeler at the point at which it contacts with the detector, and by reference to Fig. 2, it will be seen that such tangent is parallel to the length of the detector, a portion of the arc described by the feeler being indicated by dotted lines. Inasmuch as there is thus a pull on the detector in the direction of its length, it has no tendency to twist or be bent when engaged by the feeler.

The rock shaft $a$ has a slotted arm $a^2$, to which is pivotally connected by a stud $o$ a depending bent arm $a^3$, provided with a bunter $a^5$ and a toe $a^4$, which travels on the edge of a cam D, fast on the cam shaft C of the loom, the bunter $a^5$ being moved by said cam into and out of the path of one or more tappets $f$ of a tappet cam F, fast on shaft C.

If the feeler is stopped by a dropped detector, the bunter $a^5$ is held up in the path of the tappets, and engagement with one of them swings the arm $a^3$ to the rear. A slot $a^6$ in the arm receives a stud $d^9$ of a short lever $dx$ pivoted at its upper end at $d^4$ to a link $d^5$, hooked around the cam shaft, as at $d^6$ and jointed at its other end to an arm $e$ of a rock shaft $e^x$, having a knock off arm $e'$ to engage and release the shipper lever S from its usual holding notch. A rod $e^2$ connects the lower end of lever $dx$ and the arm $e$, the connection $e^3$ acting as the fulcrum for the lever when the bunter $a^5$ is acted upon by the tappet cam F, the swing of the upper end of said lever moving the link $d^5$ longitudinally to operate the knock off arm $e'$ and release the shipper handle S. The weight of the arm $a^3$ and its connected parts serves to swing the feeler towards the detectors and to keep the toe $a^4$ on the cam D, the reverse swing of the feeler being controlled by said cam. *(Draper Co.)*

## EDWARD'S DETECTOR FOR WARP STOP MOTIONS.

The object of this detector is to do away with the threading of the warp in the detectors (of other construction) previous to drawing the warp in the harness.

The new detector is clearly shown in the accompanying illustration, also its method of attaching it to the warp (one detector for each warp thread $w$). The detector has two hooks, one of which is adjusted to a supporting rod located near the whip roll which keeps the detector in its proper place in the loom and around which supporting rod the detector turns. The other end of the detector straddles the warp thread $w$, the detector resting on it in a horizontal position as long as the warp thread is in normal condition. But

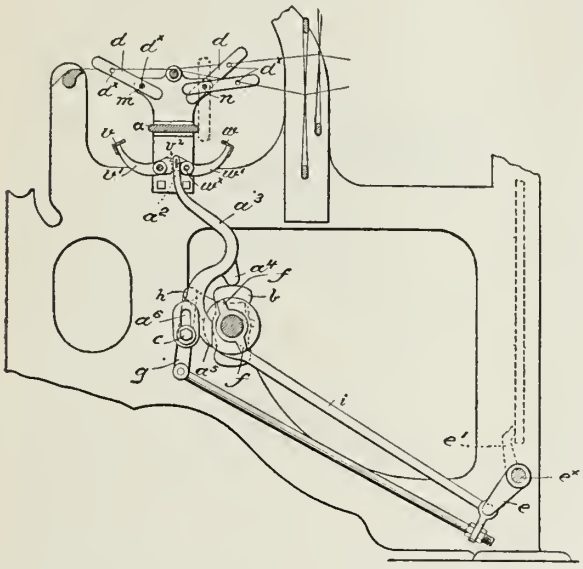

when the thread breaks or becomes excessively slack, the detector drops by its own weight, the rear hook turning around the supporting rod previously referred to, and the front hook coming in contact with the feeler of the stop motion, thus stopping the loom by the same mechanism as described in the articles on the Draper and the Northrop warp stop motions preceding this article.

The detector is shown as being made of thin sheet metal, but may be made of strong wire bent at each end, answering the same purpose; again the sheet metal detector shown can have its rear hook changed into a solid extension with a hole through which the supporting rod is passed. *(Draper Co.)*

## DRAPER'S WARP STOP MOTION, USING TWO SERIES OF DETECTORS.

The motion is clearly shown in the illustration, in connection with that portion of a loom (longitudinal sectional view) to which it refers.

Two sets of detectors $d$ are used, and which are made of thin flat strips of sheet metal, much longer than wide, and provided with two holes $d^x$, one for their mounting on to rods $m$ and $n$, respectively, the other hole being for the warp thread to pass through



and keep them out of reach of their respective feelers $v$, $w$.

In the illustration three detectors are shown in full outlines (there is to be one detector for each warp thread) representing their position when the warp is in normal condition (the action of the upper and lower shed being shown), *i. e.*, the warp thread not broken; thus holding the detectors out of reach of the feelers $v$ and $w$.

The moment a warp thread breaks (or gets sufficiently slack) its detector drops into the position shown in dotted line, being stopped by and resting against bar $a$; thus when the feeler $w$ (and what also refers to feeler $v$ if a detector should have dropped on the rear set), makes its inward movement, it is arrested by this detector, and the stop motion brought in action thus: An arm $a^2$ on the rock shaft $w^x$ has connected to it a bent arm $a^3$ provided with a toe $a^4$ and a bunter $a^5$, working with a cam $b$; said bunter being moved into and out of the path of one or more tappets $f$ made fast to the cam $b$.

The two feeler arms $w^1$ and $v^1$ are connected as shown at $v^2$ and act in unison. When either feeler is arrested by one of the detectors, it throws the bunter against the tappets, thereby causing the arm $a^3$ to swing to the rear. This arm is slotted at $a^6$ to receive a stud $c$ on a short lever $g$, pivoted at $h$, to a link $i$, hooked around the cam shaft, and jointed at its other end to the arm $e$ on the shaft $e^x$, which carries the knock off lever $e^1$. When the bunter is operated by the tappets $f$ the swing of the arm moves the link $i$ longitudinally and so operates the knock off arm and releases the shipper rod.

The two feelers $v$ and $w$ are moved toward the detectors by the weight of arm $a^3$, the outward movement being effected by cam $b$. *(Draper Co.)*

## ANOTHER WARP STOP MOTION FOR DRAPER LOOMS.

When the loom is running the detectors receive little or no movement, so that lint gathering on them, in some constructions of detectors, more or less clogs their warp eyes, thus preventing the free passage of the warp thread and also the action of the detector.

In the new detector this objection is overcome by forming its thread guiding portion as an elongated slot, open at its lower end so that the lint will not accumulate on the detector but will drop down and out of the slot. The parts of the detector at each side of the slot are made of unequal length, so that the blow of the feeler is received by the edge of the longer leg, thereby greatly reducing the tendency of the detector to twist.

Two series of detectors are used and which are obliquely positioned, to permit the use of one feeler only, the vibratory movement of which forms an arc as shown in dotted lines, Fig. 2.

Fig. 1 shows in side elevation a part of a loom showing the stop motion applied thereto. Fig. 2 is a sectional view (enlarged compared to Fig. 1) of the detectors, taken parallel to the warp threads, showing in dotted lines the position of a dropped detector, and Fig. 3 is an enlarged side elevation, compared to Figs. 1 and 2, of one of the new detectors.

The stands $a$ support a warp roll $a^1$, between which and the whip roll $a^3$ are located three supporting bars $a^2$, the detectors $b$ being placed in series between these three bars $a^2$.

One of these detectors is used for each warp thread, and has at its upper end an elongated slot $b^1$, which receives a flattened guide bar $b^3$. The lower portion of the detector is longitudinally slotted at $b^2$ to form a warp receiving opening, open at its lower end and forming two separate legs $b^4$, $b^5$ of unequal length.

The supporting bars $a^2$ are flattened and give a firm support to the detectors $b$ and coöperate with the guide bars $b^3$ to firmly hold a released detector, the supporting bars $a^2$ forming a solid back for a detector when engaged by the feeler $d^2$.

Within the arm $g$ is a bearing hub, in which is mounted loosely a short rock shaft $g^x$, provided at its outer end with a catch $g^1$, the inner end of the rock shaft having an arm $g^4$, to which is loosely jointed one end of a rod $g^5$, which in turn is jointed loosely to a pin on the knock off lever $g^6$, which is fulcrumed on the notched holding plate for the shipper lever $a^4$. The lever $d^3$ is also mounted loosely upon the rock

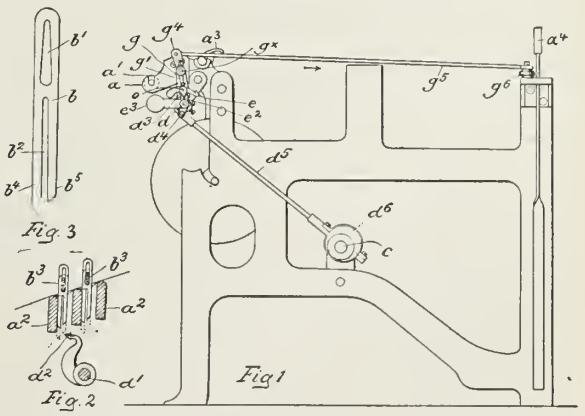


Fig. 3



Fig. 2

shaft $d$, said lever having a hole at one end for the reception of a pin $d^4$, by which it is joined loosely to a connecting rod $d^5$, having at its other end an eccentric strap surrounding the eccentric $d^6$ on the cam

shaft $e$. The overbalanced latch $e$ is pivoted on a stud $o$ and is provided with a hook, while the outer end of the part $d$ of the rock shaft has fixed to it a weighted arm $e^3$, provided with a toe $e^2$. The feeler $d^2$ is vibrated by means of the cam $d^6$ acting through the rod $d^5$; but if the feeler meets a detector $b$ and the movement of the rock shaft $d^1$ or the shaft $d$ is obstructed, the movement of the weighted lever $e^3$ is also obstructed, while the lever $d^3$ continues to move, and in its movement the overbalanced latch $e$ is released to turn upon the stud $o$ far enough to cause the hook of the latch $e$ to rise and engage the catch $g^1$, said latch, during its further movement by or through the eccentric $d^6$, turning the rock shaft $g^x$, and thereby moving the connecting rod $g^5$ in the direction of the arrow, thus stopping the loom. (*Draper Co.*)

## MOVABLE WARP STOP MOTION.

The object of this stop motion is to provide, in cotton looms, means to be able to move the mechanism and its supports toward the harnesses in order to have easy access for the removal of the warp beam, at the same time using the feeler rock shaft as a warp rest.

Fig. 1 shows a vertical sectional view of the mechanism with one of the detectors in normal, the other in dropped position.

Brackets $C^3$ secured to the inner side of the end stands of the loom by the bolts $o$, being bifurcated at their lower ends to straddle the rock shaft F, and bent to form hook like supports $C^4$, which hold the rods $d$ for forming rests for the warp $w$.

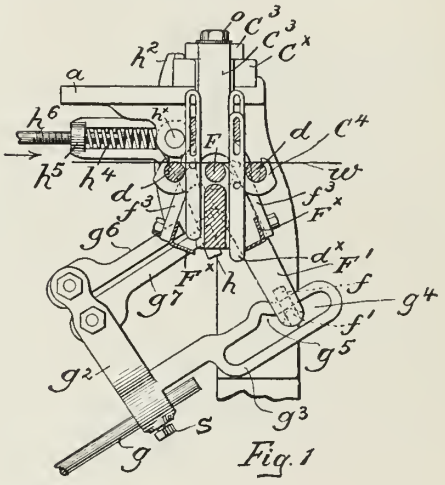
Two feelers $F^x$ are attached to two arms $f^3$ secured to the rock shaft F, so that as the latter is rocked the feelers will be vibrated.

Rock shaft F is actuated by rod $g$ which is connected at its lower end (not shown) to one of the lay swords, its upper end being connected to the **L**-shaped frame $g^2$ by set screw $s$. The arm $g^3$ is slotted at $g^4$, the upper side of said slot being notched as at $g^5$. The slotted portion of the arm $g^3$ travels between the arm $F^1$ and the upturned guide $f$ in such manner that when the loom is running properly the toe $f^1$ will rest in its seat $g^5$ by the weight of the actuating member $g$ and the parts carried thereby, so that the reciprocatory motion given to said actuating member by the lay sword will rock the arm $F^1$, and thereby vibrate the feelers.

When either feeler is engaged by a dropped detector $d^x$ the arm $F^1$ is held stationary, the beveled sides of the seat $g^5$ and toe $f^1$ coöperate to lift the slotted arm $g^3$, and thereby unseat the toe $f^1$, as shown in illustration, so that the longitudinal movement of the actuating member $g$ can continue, the toe and its seat forming a slip connection between the arm $g^3$ or actuator and the feeler. The upturned arm $g^2$ of the frame has rigidly bolted thereto two oppositely acting bunters $g^6$ and $g^7$, the latter and longer of the two bunters being upturned at its outer end to form a shoulder (see dotted lines). These bunters move in unison with the actuator of the feeler vibrating mechanism and normally are out of the path of a controlling dog $h$, mounted on a short rock shaft $h^x$. The lower end of the dog $h$ is cut away to leave a depending guide finger extending adjacent the sides of the bunters. A double wiper cam $h^2$ is secured by a set screw to the short shaft $h^x$, the oppositely extended toes of the cam normally resting against the offset ends of a **T**-casting, slotted, as at $h^4$, to receive the shaft $h^x$. The foot $h^5$ of the casting has screwed thereinto a link $h^6$, extended forward and pivotally connected to the knock off lever which operates the shipper rod.

When the shaft $h^x$ is rocked in one or the other direction the wiper cam $h^2$ will engage either the upper or lower portion of the **T**-shaped casting previously referred to, and will move the latter rearwardly to draw the link $h^6$ in the direction of the arrow, thereby operating the knock off lever, thus releasing the shipper handle from its holding notch.

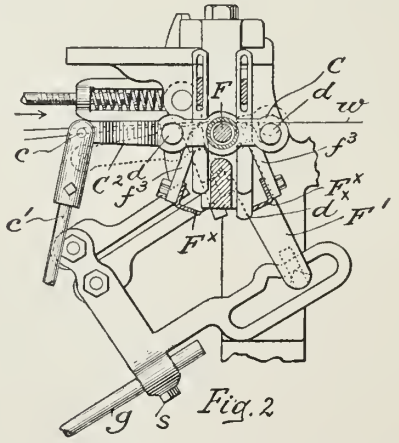
A spring $s$ is interposed between the shaft $h^x$ and the threaded end $h^5$ of the **T**-shaped casting previously referred to, said spring returning the casting and link $h^6$ to normal or inoperative position when the wiper cam $h^2$ is in normal or inoperative position.




To move the mechanism in order to permit ready access for removal of the warp beam, bolts (not shown in the illustration), situated behind the bolts $o$, are provided and which secure the plates $C^x$ to the supports $a$. These bolts are simply removed, and the mechanism can be slid forward on the supports $a$. When a new beam in turn has been inserted and the loom ready for weaving the mechanism is slid back and the bolts as previously removed replaced.

ANOTHER IMPROVEMENT.

Fig. 2 is identical to Fig. 1 in the general plan, but has an additional device applied thereto, to prevent




lint from gathering on the detectors. For this purpose the bracket C, holding the rods $d$, is mounted on the shaft F, one end of said bracket being extended as at $C^2$, and is pivotally connected at $c$ with a rod $c^1$, which is downturned and bent, being connected at its

free end to the lay sword, the movement of the latter causing the rods, *i. e.*, the warp rests *d*, to be rocked. The warp threads as passing through the eyes of the detectors thus impart to the latter a slight vibratory motion, sufficient, however, to keep them free from lint. *(Draper Co.)*

## LOCATING THE DETECTORS OF THE WARP STOP MOTION NEARER TO THE HARNESSES.

In this manner the use of lease rods is obviated, the detectors performing two functions: first, act as detectors when a thread breaks or becomes unduly slack; second, act as a lease rod in the proper position in the loom so as to produce the best results with reference to the face of the cloth woven, since cotton manufacturers claim that in order to secure the best results the leasing devices should be so located as to bring the crossing of the warp threads about as far from the harness on the one side as is the fell of the cloth on the other, in order to relieve the yarn from strain as much as possible by making the angles of the warps on each side of the harness as nearly alike as possible.

Using two series of detectors: To explain the change in the position of the detectors in the loom, illustration Fig. 1 is given, being a sectional view of a sufficient portion of a loom showing the various parts in their proper positions. Detectors *d* are of the usual construction, two series being used, the only new feature consisting that in place of being located near the whip roll W they are placed nearer to the harness, being adjusted to the bracket A as fastened to the loom frame.

The general arrangement and operating of said detectors has been described in several articles before under the heading of Warp Stop Motions referring to

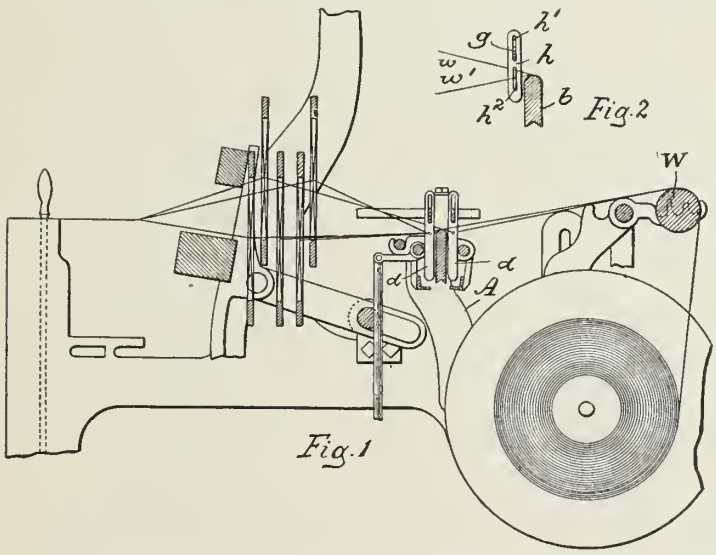


Fig. 1



Fig. 2

the Draper Co., hence no special explanation is required. This using of two series of detectors can be applied with equal advantage to any number of harnesses used.

Using one series of detectors only: Although the before mentioned arrangement of using two series of detectors is the best (on account of not crowding them) yet now and then said detectors may be used arranged in one series. To explain this arrangement of using the detector in one series and in the same position as shown in Fig. 1 and for the same two purposes explained at the beginning of the article (*i. e.*, for detectors and lease rods combined) illustration Fig. 2 is given, which clearly explains the threading of said detectors thus: *h* the detector, *h'* the slot for carrying guide rod *g*, *b* the back stop for the detectors. Warp threads *w* and *w'* are threaded both into the lower slot $h^2$ of the detector, but in a reversed direction compared to each other as clearly shown in the illustration, thus forming the characteristic lease. This using of one series of detectors refers to plain work only, its general arrangement and working having been described in "Textile Machinery, Part I" page 78. *(Draper Co.)*

## NORTHROP'S WARP STOP MOTION IN WHICH THE HEDDLES ARE USED TO ACT AS DETECTORS.

Fig. 1 is a vertical sectional view, taken at right angles to the crank shaft, of a portion of a loom having the new mechanism applied thereto. Fig. 2 is a sectional detail similar to Fig. 1, but shows one of the actuating detector heddles in abnormal position and the operation of the loom stopping means, by or through the stoppage of the feeler. Fig. 3 is a detail view of a part of a feeler actuating means.

The stop motion actuating detector heddles have a limited vertical movement relative to their normal position given them for weaving. Rocking shafts *d* and *e* are located below and at the front and rear of separator A. The feelers $d^x$ and $e^x$ are attached to their respective rocking shafts, and are vibratable toward and from the separator below the two series of detector heddles *h*, by the intermeshing segment gears *d'* and *e'* Fig. 1, this insuring vibration of the feelers in unison.

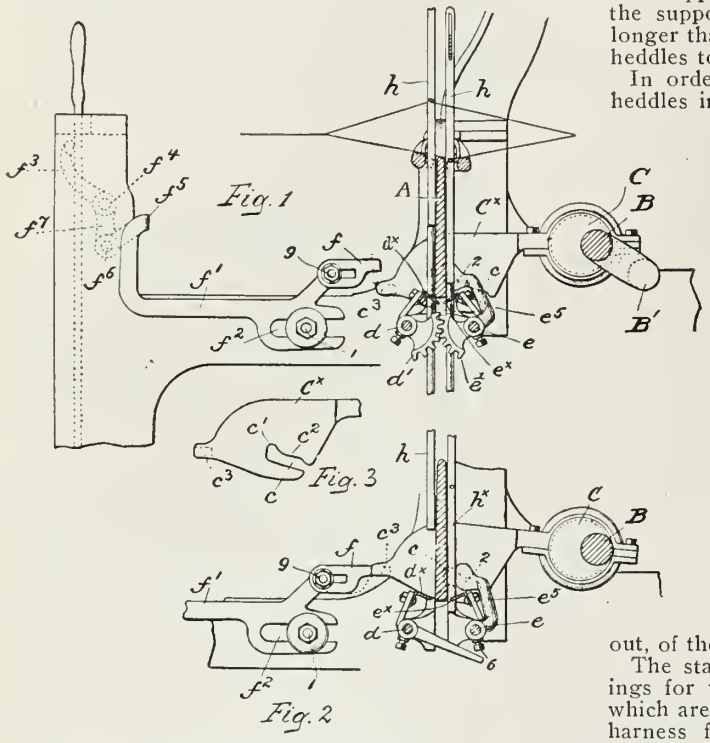
Eccentric C is secured to the crank shaft B between one of the cranks B' and the shaft journal box. The actuator $C^x$ will be reciprocated by the rotation of the eccentric, and it can also be rocked or tipped about the latter as a center, the reciprocatory movement being utilized to normally vibrate the feeler which is connected with the actuator $C^x$.

Referring to Fig. 3, an irregular slot *c* is made in the actuator $C^x$, extending from the lower rear corner upward and forward, the inner end of the slot being rounded, as at *c'*, with its upper edge $c^2$ convexed to form a cam surface, the said slot receiving a pin or projection 2, extended laterally from a bent arm $e^5$, securely attached to one of the rock shafts, as *e*, by a set screw 6. The actuator $C^x$, the actuating means for the feeler and the feeler being thus connected by a slot and pin connection.

Under normal conditions the weight of the actuator $C^x$ will cause it to be supported by the projection 2 in the rounded end *c'* of the slot, as in Fig. 1, the action of gravity being thus utilized to a certain extent to effect the movement of the feelers toward the detector heddles.

In Fig. 1 the actuator is shown as fully forward, and rotation of the crank shaft will cause the actuator to be moved to the right or rearwardly to thereby draw back the arm $e^5$ and rock the shafts *d* and *e* to move the feelers away from the detector heddles.

Supposing that a detector heddle is abnormally positioned by the breakage or undue slackness of its warp thread, as at $h^x$, Fig. 2 the coöperating feeler, as $e^x$, will be stopped and the projection 2 held stationary, so that in the forward stroke of the actuator $C^x$ the cam surface $c^2$ will ride over the projection, lifting or rocking the actuator out of its normal reciprocatory path. At its front end the actuator is enlarged laterally by a lump or projection $c^3$, (see dotted lines),




and when the actuator is reciprocated in its normal path the projection $c^3$ will not engage a bunter $f$, forming a part of the stopping mechanism of the loom. When moving in abnormal path, however, as described, due to stoppage of the feeler by engagement with an abnormally positioned detector heddle, the actuator will engage and move the bunter $f$ from dotted to full line position, as in Fig. 2, said bunter being adjustably attached by a bolt 9 to a link $f'$, slotted at $f^2$ to travel on a guide stud 1 on the loom frame. A knock off lever $f^3$ is fulcrumed at $f^4$ on the loom frame to bear against the shipper lever and throw it out of its holding notch when the loom is to be stopped and the link $f'$ is bent at $f^5$, Fig. 1, and carried outside of the loom side and pivotally connected at $f^6$ with the arm $f^7$ of the knock off lever, to operate the latter when the link $f'$ is moved to the left by the actuator $C^x$. *(Draper Co.)*

## DEVICE FOR SECURING THE PROPER ACTING OF DETECTOR HEDDLES.

The object of the device is to insure a uniform and proper operation of the heddles (also serving as actuating detectors for the stop motion mechanism) and maintaining the heddles in a more nearly vertical position, when weaving goods with a heavy strain on the warp threads.

In practice these heddles frequently become magnetized and tend to stick together, and some will lag behind others of the series during the reciprocation of the frames as required for the change of the shed, this irregular and improper operation of the heddles resulting in impaired quality of the cloth being woven.

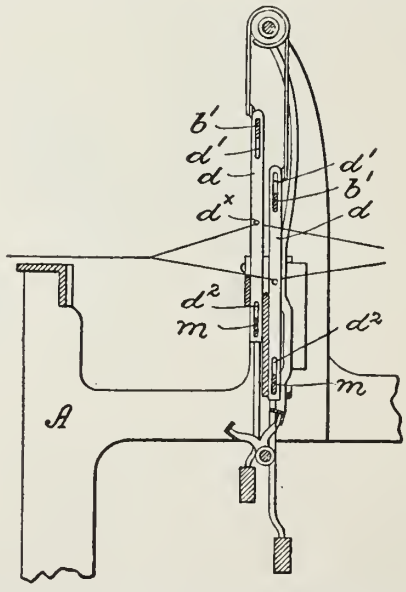
The illustration is a cross sectional view of part of a loom, having the device attached thereto.

A is the loom frame, $d$ are the metallic detector heddles, having warp eyes $d^x$ and being provided near their upper ends with longitudinal slots $d'$ to receive the supporting bar $b'$ of the frame, the slots being longer than the depth of the bar in order to permit the heddles to act as detectors.

In order to effect the movement of said detector heddles in unison, there is applied an evening device thereto, below the warp threads, being a rod $m$, passed loosely through longitudinal slots $d^2$, located near the lower ends of the heddles, said rod being supported by the series of heddles. The weight of this evener rod is sufficient to overcome any tendency of some of the heddles to stick up higher than the others, for on the downward stroke of the frame the weight of this evener rod would come upon any one or more of the heddles which lagged behind the others, thus positively depressing them with the others.

Another way of depressing lagging detector heddles is shown by means of these three illustrations and of which Fig. 1 represents in front elevation, and centrally broken out that portion of a loom as necessary to be shown in connection with the new device to explain the action of the latter. Fig. 2 is a cross sectional view of Fig. 1, taken on the line $x$-$x$ looking toward the left; and Fig. 3 is an enlarged perspective view, centrally broken out, of the evening device detached.

The stands A′ on the loom frame A provide bearings for the overhead shaft $a$, having sheaves $a'$, to which are attached flexible connections $a^2$ between the harness frames, the latter comprising upright side bars $b$ and top and bottom cross bars $b'$ $b^2$, the bot-

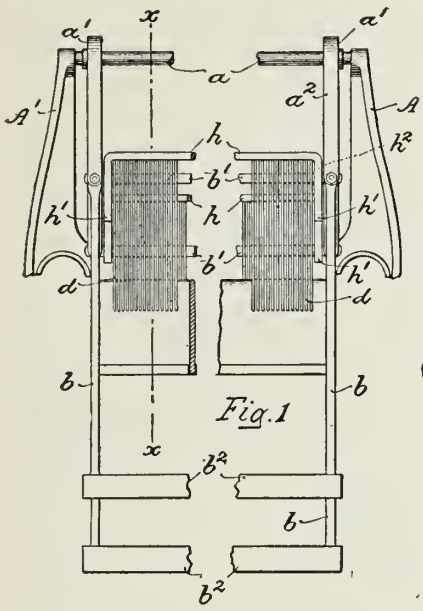


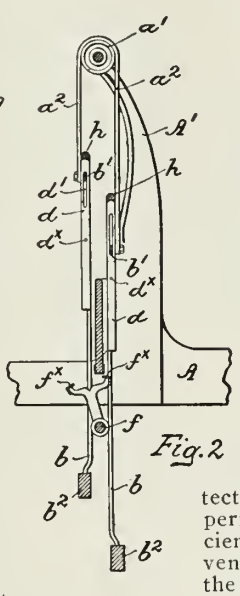

tom bars being connected to the actuating treadles (not shown). $f^x$ are the normally vibrating feelers

mounted on the rock shaft *f*, Fig. 2, stoppage of a feeler by engagement with an abnormally positioned detector heddle operating to stop the loom upon breakage or undue slackness of a warp thread.

The detector heddles *d* have warp eyes $d^x$ and longitudinal slots $d'$ at or near their upper ends to receive the supporting bar $b'$ of the frame, the slots $d'$ being longer than the depth of the bar to permit detecting operation of the heddle.

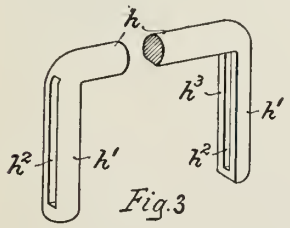
To insure the normal movement of the detector heddles in unison, an evening device is applied, the




weight of which is sustained wholly by the heddles. Said device consists of a rod or bar *h*, bent at its ends $h'$ at right angles to its main or body portion, said ends being longitudinally slotted at $h^2$, Fig. 3, and with their inner faces $h^3$ flattened or planed and in parallelism with each other. The supporting bar $b'$ for the heddles is extended through the slots $h^2$ of the evening device to guide the latter merely, the slots being of much greater length than the depth of the heddle support $b'$ so that the evening device *h* has a vertical movement independent of the heddle support.

Between its ends the under side of the evening bar *h* rests upon the upper ends of the detector heddles and is sustained vertically wholly thereby, its weight being sufficient to overcome any tendency of some of the heddles to stick up higher than the others, as on the down stroke of the heddle frame the weight of the evener would come more fully upon and would depress any lagging heddles, so that all will be moved in unison.




The evener does not in any way interfere with the dropping of a heddle upon failure or undue slackness of its warp thread, as the other heddles at such time will sustain the evener.

With reference to Fig. 1 it will be seen that the evener straddles the series of detector heddles, the inner faces $h^3$ of the ends $h'$ extending outside of and adjacent the flat faces of the endmost heddles of the series, so that said ends act as side stops to limit lateral play or movement of the heddles, and thereby preserve the series in proper upright position. *(Draper Co.)*

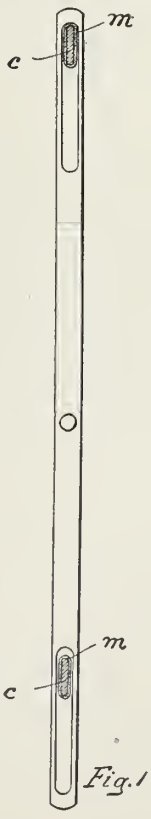
## SUPPORTING ROD FOR DETECTOR HEDDLES.

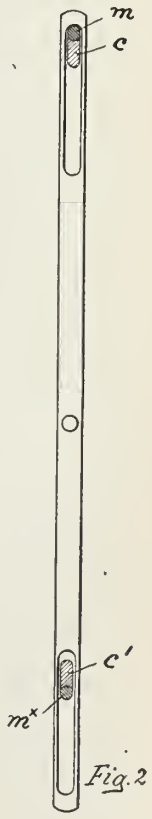
The constant and quick tapping of the transverse bar upon the detector heddles, at the ends of the slots therein, causes magnetization of said detector heddles, the disadvantage of which has been referred to in the preceding two articles.

To overcome this magnetization of the detector heddles is the object of the new construction of the supporting bar, the accompanying illustration Fig. 1 showing the same in side elevation.

These supporting bars *c* are covered with a buffer *m*, made of felt and which buffer is so interposed between the bar and the detector heddles that the impact of metal with metal is prevented, the force of the blow also softened and magnetization of the detector heddles stopped, the buffer also acting as a yielding cushion when a bunch or knot on the warp thread engages the eyes of the detector heddle, permitting sufficient give to prevent breakage of the thread.

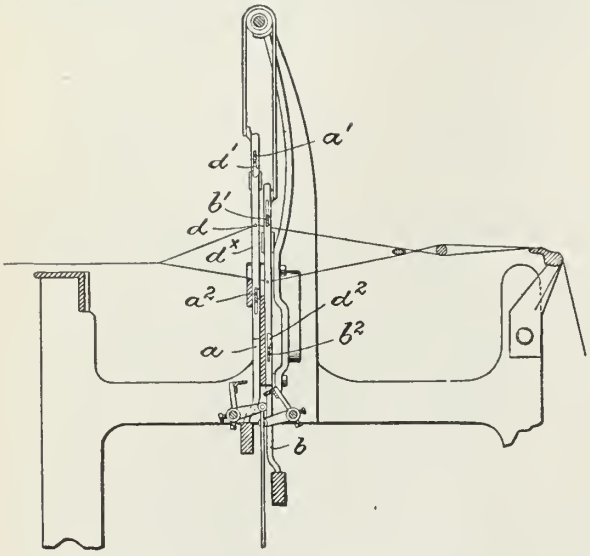
Although it is more advantageous to surround or incase the supporting bar with the buffer as thus explained, especially when it is desired to obviate magnetization of the detectors; yet when it is desired more particularly to use the buffer to prevent yarn breakage it may be constructed as shown in Fig. 2 the buffer *m* being applied to the upper edge of the bar *c*, and if two bars are used, the lower edge of the bar $c'$ is also provided with a yielding felt buffer $m^x$. *(Draper Co.)*



## REMOVABLE DETECTOR HEDDLE.

The construction of the new detector heddle permits its application to or removal from the supporting bar at any point with the greatest ease without any disarrangement of either the bar or the other detector heddles of the series.




The illustration represents in longitudinal section a sufficient portion of a loom having the new detector heddle applied thereto. Examining the illustration we find the side bars *a b* of the harness frame rigidly connected by transverse bars *a' a² b' b²*. Vibrating feelers coöperate with the detector heddles $d^x$, which are stamped from thin sheet steel in tape like form, of any width desired, the completed detector heddle having parallel longitudinal edges, and a warp receiving eye *d*.

The detector heddle shown in the illustration can be applied to either one or a pair of supporting bars, and in order to secure such adaptation the detector heddle is provided at or near each end with an open slot *d'*, extending in the direction of the length of the detector heddle and having its entrance $d^2$ at one of the longitudinal edges thereof. The entrance $d^2$ to the slot is shown as located between the ends of the slot, and adjacent the inner ends, forming an open supporting hook, the tongue of which lies within the boundaries of the detector heddle.

In order that the detector heddle may be used with a single supporting bar, the slots are made to extend beyond each end of the entrance thereof, so that the bar will have a bearing when depressing the detector heddle, as when the harness frame is in the lower part of the shed, and to prevent accidental disengagement of the detector and its bar.

The entrance $d^2$ is made narrower than the depth of the supporting bar, to prevent accidental displacement of the detector heddle when in position on the bar.

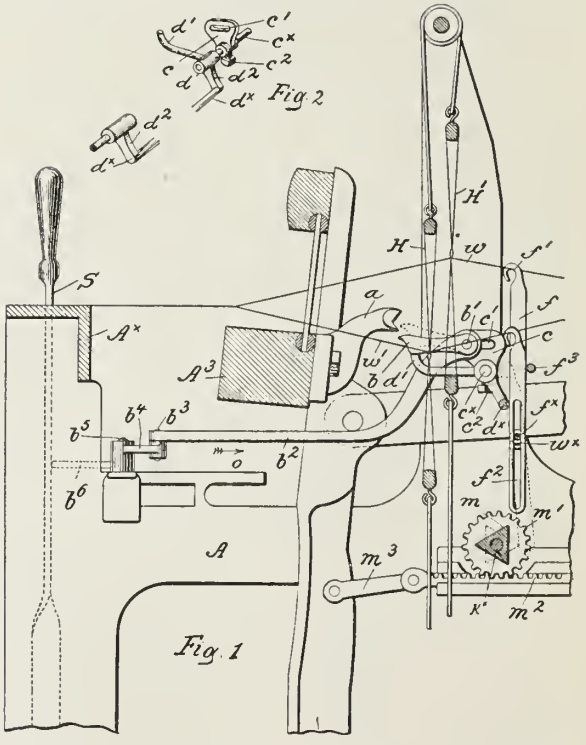
To apply a detector heddle to a single bar, the former is tipped to slide the hook over the bar, and when the bar is in the slot, the detector heddle is moved back into vertical position, as shown in illustration, removal of the detector heddle being effected by a reversal of the movements above set forth. Consequently a detector heddle may be applied to a bar at any point without in any way disarranging or changing the position of the bar or detaching it from its supports.

When a detector heddle is to be applied to two bars, as to a harness frame such as shown in illustration, the detector heddle is applied to one bar, as described, and then the tongue of the hook at the other end of the detector heddle is deflected sufficiently to permit entrance of the other bar into the slot forming the hook, the flexibility and resiliency of the material of the detector heddle permitting such deflection without injury. *(Draper Co.)*

## ALLEN'S DETECTOR MECHANISM FOR COTTON LOOMS.

Fig. 1, in vertical longitudinal section, represents portion of a loom, having this mechanism applied thereto. Fig. 2 is a perspective detail of a portion of the mechanism shown in Fig. 1.

A indicates the loom frame, $A^x$ the breast beam, $A^3$ the lay, S the shipper lever, and H $H^1$ the heddle frames. The lay is provided at its rear side with a bunter *a*, adapted at times to engage a dog *b*, pivotally mounted at $b^1$ on a link $b^2$, jointed at $b^3$ to a rocker arm $b^4$, mounted to rock on fulcrum stud $b^5$; the hub of the rocker arm having a knock off arm $b^6$ to throw the shipper lever out of its holding notch when the link $b^2$ is moved in the dirccion of arrow *o* by engagement of the dog *b* and bunter *a*. The upper end of the link $b^2$ is supported by the fulcrum stud $b^1$, which is extended into a slot $c^1$ of a guide plate *c*, the hub of which is secured by a set screw $c^2$ rigidly to a stud $c^x$, extended from the inner face of the loom side, and said stud has also loosely mounted thereon a second hub *d*, provided with an upturned arm or finger $d^1$, extended beneath the dog *b*, and with a second depending arm $d^2$, to which is secured a light rod or shaft $d^x$, extended across the loom back of the harness mechanism, and having at its other end a second arm $d^2$ (see Fig. 2), journaled in the opposite loom side.




The warp stop motion actuating detectors, are thin,

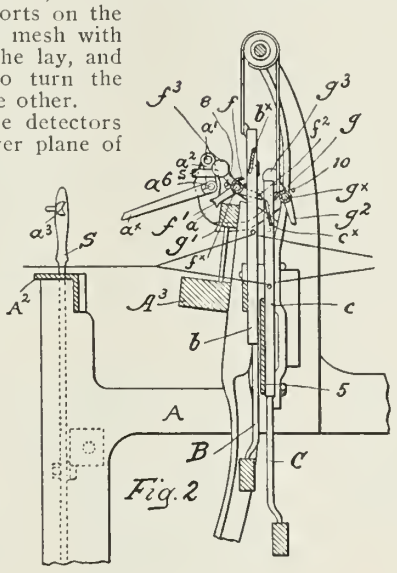
flat metallic plates $f$, hooked at $f^1$ to embrace the warp threads $w$ and having longitudinal slots $f^2$ therein, through which slots is extended across the loom a fixed bar $f^x$, forming a guide to prevent displacement of the detectors, said guide being assisted in this function by an auxiliary bar $f^3$, extended across the backs of the detectors and the rod $d^x$, which extends across their front.

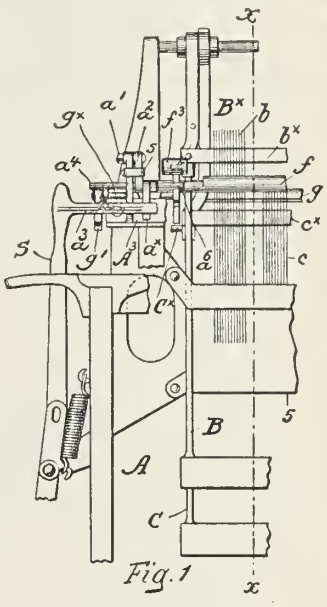
Under normal conditions the detectors will rise and fall as the shed is formed, and there will be no change in the position of the dog $b$ from its full line position, Fig. 1.

Below the lower ends of the detectors a feeler is mounted, said feeler being a triangular bar $m$, rotatably mounted on a shaft $k^x$, held in supports on the loom frame and rotated by a pinion $m^1$ in mesh with a rack $m^2$, connected by a link $m^3$ with the lay, and to be moved back and forth thereby to turn the feeler first in one direction and then in the other.

When the loom is running properly the detectors supported by the warps, as $w^1$, in the lower plane of the shed will be held thereby above or out of range of the longitudinal edges of the feeler; but if a warp thread breaks, whether in the upper or the lower plane of the shed, or unduly slackens, the detector will drop and its lower end will be brought into position to be engaged by one of the edges of the feeler, and the detector will be swung thereby out of its vertical plane, turning on the guide bar $f^x$ as a fulcrum. Such a condition is shown in dotted lines, and such feeler induced movement of a detector will act upon the transverse bar $d^x$, pushing the same forward and thereby elevating the finger or arm $d^1$ to lift the dog $b$, into position to be engaged by the bunter as the lay moves back. The completion of the backward stroke of the lay will move the link $b^2$ in the direction of the arrow $o$ releasing in turn the shipper lever from its notch in its holding plate, thereby stopping the loom.

The detectors are separated by means of thin washers $w^x$, mounted on the guide rod $f^x$ between each two detectors. *(Draper Co.)*




## NORTHROP'S WARP STOP MOTION, ACTING DIRECTLY ON THE SHIPPER HANDLE.

The controlling means of this stop motion are located above the warp, thus easily set and adjusted and practically free from deposits of lint. The operation of the feeler, which forms a part of the controlling means, is effected by the reciprocating motion of the harness frames, but is not connected directly therewith, so that it is easy to adjust the feeler and coöperating devices.

Fig. 1 is a partial front elevation of a loom with the new stop motion applied thereto. Fig. 2 is a vertical sectional view thereof on the line $x$-$x$, Fig. 1, looking toward the left.

A indicates the loom frame, $A^3$ the lay, S the shipper, and $A^2$ the breast beam. The lay has mounted thereon at the end adjacent the shipper a bracket $a$, on which is pivoted at $a'$ an arm $a^2$, having an attached dagger $a^x$, adapted to be moved into position to engage a lateral (concaved on its inner face) extension $a^3$ on the shipper. A spring $s$ on the bracket bears frictionally on the arm $a^2$ and retains the dagger either in operative or inoperative position, while a stud or pin $a^4$ on the arm passes through a slot in the bracket, said stud extending laterally beyond the outer side of the arm at $a^6$.

The detectors serve as heddles, two series of such detectors $b$, $c$, being shown as thin, flat sheet metal strips having warp receiving eyes and inclined slots and correspondingly inclined supporting bars $b^x$, $c^x$, extending through the slots and being secured to the frames B, C.

The lower ends of the detectors are free, and the two series are separated by a tranverse plate 5, attached to the loom frame.

The slots in the detectors are longer than the width of the cross bars extended therethrough, so that the detectors have a limited vertical movement relative to the bars, and by virtue of the inclination of the latter the detectors have also a horizontal movement edgewise or in the direction of the length of the warp. The slots in the detectors $b$ are inclined oppositely to those in the detectors $c$. Transverse rock shafts $f^x$, $g^x$, are mounted on the loom back and front of the detectors and adjacent thereto, and the feelers $f$ and $g$ are attached to said shafts, the feelers being plates of metal bent around the shafts and carried beyond them in a curve toward the adjacent edges of the detectors. The feelers are normally moved back and forth or rocked and if the warp threads are intact the detectors will not be moved into the path of movement of the adjacent feeler. Now when the detector supporting bar descends the inclination of the slots in the detectors, and the inclination of the bar will cause the detectors to move edgewise away from the adjacent feeler shaft.

If a warp thread breaks or unduly slackens, however, its detector will drop in advance of the descent of the supporting bar and will move edgewise toward the path of the feeler, so that the edge of the latter will engage the extreme end of and be stopped by the thus abnormally positioned detector, the support resisting the pressure on the detector in the direction of its length. A finger $f'$, having a notched end, is vibratable with the feeler $f$, and when the movement of the latter is stopped, the finger is brought into position to engage the projecting end $a^6$ of the pin as the lay moves back and thereby swing the dagger $a^x$ into operative position to release the shipper at the next forward stroke of the lay.

The spring $s$ acts as a detent to hold the dagger in

position when set, and when the dagger engages the extension $a^2$ the dagger will be moved by the impact into normal position before the final movement of the lay releases the shipper, so that the dagger is automatically reset after each operation thereof.

Finger $g'$, movable with the feeler $g$, is located to operate on the projecting end of the pin $a^4$ when said feeler is stopped to set the dagger.

The vibration of the feelers is effected initially in a positive manner, the movement being completed by momentum of the feeler, rocker arms $f^2$, $g^2$, being movable with the feelers and projecting into the paths of projections $B^x$, $C^x$, on the two harness frames. Each feeler is also provided with an upturned arm carrying a weight, as $f^3$ $g^3$, this weight tending to carry the feeler to its extreme position when it has been moved past the center in either direction. In Fig. 2, the feeler $f$ is shown in one extreme position, and as the frame B descends the projection $B^x$ hits the rocker arm $f^2$ and throws the weight $f^3$ over the center, so that the movement of the feeler to its other extreme position or toward the detectors is completed by gravity after the harness has reached its lowest position. The upstroke of the harness frame causes the projection $B^x$ to hit the weight $f^3$, throwing the feeler in the direction away from the detectors, and the operation of feeler $g$ is similarly effected through the projection $C^x$. The parts are so timed that an abnormally positioned detector will present its end into the path of the feeler on its inward stroke, so that the movement of the feeler will be stopped with the finger in position to effect the operation of the dagger $a^x$. Stops 8 and 10 are provided to limit the outward throw or movement of the feelers $f$ and $g$, respectively. *(Draper Co.)*

## STOP INDICATOR FOR LOOMS.

This stop indicator has for its object to indicate instantly to the weaver that the loom to which it is attached has stopped, being of advantage where a weaver tends to sixteen or more looms.

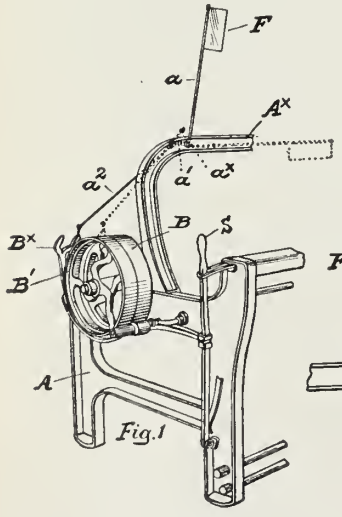


Fig. 1

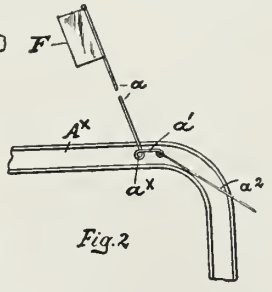


Fig. 2

Fig. 1 is a perspective view of a sufficient portion of a loom having the indicator applied thereto, and Fig. 2 is a detail in elevation of the indicator.

A indicates the loom frame, S the shipper lever; B, B' the fast and loose pulleys, and $B^x$ the belt shifter.

On the rear side of arch $A^x$ of the loom frame, is mounted a rod $a$, pivoted at its lower end on a pin or stud $a^x$, Fig. 2, and carrying at its free end a visual indicator F. The rod $a$ is provided at its lower end, adjacent its fulcrum $a^x$, with a rocker arm $a'$, and this arm is pivotally connected by a link $a^2$ with the belt shifter $B^x$, so that when the latter moves the driving belt (not shown) onto the loose pulley the indicator F will be moved up into full line position, Fig. 1, above the arch and in full view of the weaver. When the loom is started, the movement of the shifter into dotted line position will depress the indicator back of the arch $A^x$, and thus while the loom is running the indicator will be maintained in such position. *(Draper Co.)*

## DEVICE FOR INDICATING THE REASON FOR THE STOPPING OF LOOM.

The object of the new mechanism is to indicate to the weaver when running a number of looms the cause of the stoppage of a loom, *i. e.*, whether the warp stop motion, the filling stop motion, or the protector mechanism has operated.

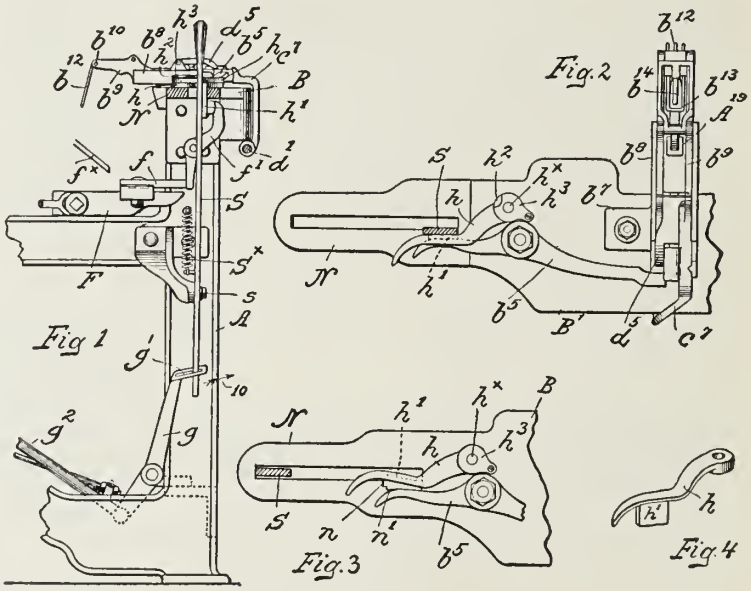



Fig. 1 is a left side elevation of a portion of a loom having the new device embodied therein, the notched holding plate for the shipper lever being shown in section. Fig. 2 is an enlarged top or plan view thereof, (compared to Fig. 1) the shipper handle being shown in section. Fig. 3 is a similar view of the holding plate, the knock off lever controlled by the filling, and the stop indicator, the shipper having been released by the operation of the protector mechanism, and Fig. 4 is a perspective view of the stop indicator.

A indicates the loom frame, B the breast beam, provided with the notched holding plate N for the shipper lever S; $b^5$ is the knock off lever, operated upon failure of the filling, to release the shipper handle. F is the frog holder, $f^x$ the actuating dagger, $f$ the frog, and $f'$ the coöperating knock off lever, constituting

the usual protector mechanism, operative when the shuttle is not properly boxed to release the shipper lever. $b^7$ is the stand and $b^8$ the guide for the filling fork slide $b^9$, the filling fork $b^{12}$ being pivoted on the stand at $b^{10}$. The tail of the fork, $b^{13}$, is adapted at times to be engaged by a hook $b^{14}$ as pivoted on the filling hammer $A^{19}$ (Fig. 2). The latch $d^5$ engages and moves the knock off lever $b^5$ upon a second successive failure of the filling to tip the fork. The operating shaft $d'$ for the filling supplying mechanism (not shown), and the arm $c^7$, are connected with and rock shaft $d'$ by the outward movement of the filling fork slide $b^9$.

The holding notch $n$ in the plate N is increased in width for a part of its length, as at $n'$ (Fig. 3) to receive a depending fin or lug $h'$, forming a part of the stop indicator, shown as an arm $h$, pivoted at $h^x$ on the breast beam, and acted upon by a washer $h^2$ (Fig. 2) held in place by cap $h^3$, attached to the breast beam.

When the shipper handle is in the notch $n$, the finger $h'$ of the stop indicator rests in the depression $n'$ of the notch against the shipper lever, and the outer end of the knock off lever $b^5$ abuts against the outer face of the finger, as in Figs. 1 and 2, so that the latter is interposed between the shipper lever and the lever $b^5$. At the same time the protector knock off lever $f'$ rests against the finger which projects below the plate N sufficiently for the purpose, as clearly shown in Fig. 1, and when the loom is running properly, the parts will be in the position shown in Figs. 1 and 2.

If now the protector mechanism is operated, the lever $f'$ will be turned to push inwardly against the finger $h'$, turning the stop indicator into the position shown in Fig. 3, and thereby forcing the shipper lever out of the holding notch $n$ to move into stopping position by the action of its spring $S^x$, Fig. 1. The knock off lever $b^5$ has not been moved, and the weaver by glancing at the stop indicator sees that it alone has been moved, and he at once knows that the protector mechanism has operated and that the fault is in the shuttle. On the other hand, if the filling fork mechanism had operated, due to failure of the filling, the latch $d^5$ would have swung the knock off lever $b^5$, and the latter would then act through the finger $h'$ to release the shipper handle, and both the knock off lever $b^5$ and the stop indicator $h$ would be in abnormal position, showing the weaver that the fault was with the filling.

The lower end of the shipper lever extends below the pivot $s$, Fig. 1, on which it is loosely mounted and enters an incline slot $g'$ in the upper end of a rocker arm $g$, controlled as to its movement by the warp stop motion mechanism, a link $g^2$, forming a part thereof, serving to at times move the rocker arm $g$. Should a warp thread break or become unduly slack, the warp stop motion mechanism will operate to swing the upper end of the rocker arm $g$ in the direction of arrow 10, Fig. 1, and the inclined edge of the slot $g'$ will act on the shipper lever below its fulcrum to move the upper end of said lever inward or out of its holding notch, and the loom will be stopped. Under such circumstances the stop indicator remains in normal position, and consequently the weaver knows at once that neither the protector mechanism nor the filling fork mechanism has operated to release the shipper lever, and that the fault must consequently be in the warp.

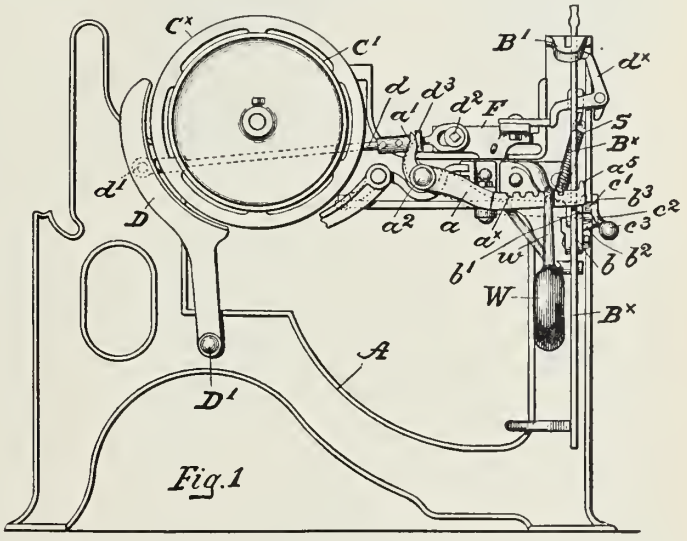
Thus by the position of the stop indicator the particular fault which has caused the loom to stop is at once made plain to the weaver and the particular fault can be remedied without necessitating an examination of the various parts of the loom. *(Draper Co.)*

## BRAKE MECHANISM FOR NORTHROP LOOMS.

The object of this brake is to stop the loom "on the pick" when required, the controlling member by which release of the brake is effected during stoppage of the loom being attached to the shipper lever and so constructed that movement of the shipper into running position will throw it out of operation automatically.

Fig. 1, in elevation, represents a sufficient portion of a loom having this brake mechanism applied thereto, the parts being shown in the position assumed when the loom is running. Fig. 2 is a partial front elevation of the brake mechanism the parts being shown in position considering the loom running. Fig. 3 is a like view, the parts being shown in position to apply the brake and stop the loom.

A indicates the loom side, B the breast beam having the notched holding plate B' for the shipper lever $B^x$, C and C' are respectively the fast and loose pulleys,




$C^x$ the brake wheel secured to, or to rotate with the fast pulley, and $B^2$ is the belt shipper.

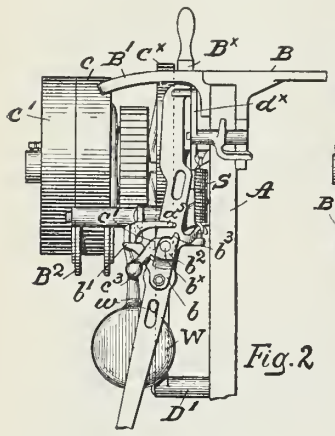
The brake shoe D is a suitably shaped arm pivoted at D' to the loom side (see Fig. 1) and jointed at $d'$ to a rod $d$, slotted at its forward end to receive a stud $d^2$ on the frog F, the latter when operated by a dagger, (not shown) upon absence of the shuttle, acting through an elbow lever $d^x$ to knock off the shipper lever $B^x$, the operation of the frog applying the brake through the rod $d$.

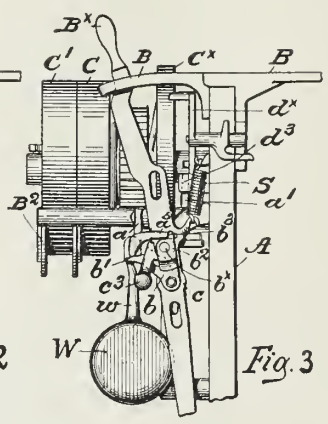
A collar $d^3$ on the brake rod (see Fig. 1) is adapted to be engaged by the upturned short arm $a'$ of a lever $a$, pivotally mounted at $a^2$ on a stud secured to the loom side, the lever $a$ supporting a weight W, the hooked stem $w$ thereof being adapted to engage one of a series of notches $a^x$ in the lever arm $a$ to adjust the weight toward or from the fulcrum $a^2$. The weight when free to act moves the lever $a$, $a'$ into dotted line position, Fig. 1, and through the rod $d$ applied the brake, the lever and weight constituting a brake actuator.

A bracket or stand $b$, having an extended toe $b'$ and an outwardly bent upturned ear $b^2$, is rigidly secured to the side of the shipper lever $B^x$ adjacent its fulcrum $b^x$, the toe $b'$ being of sufficient length to extend beneath the lever arm $a$, maintaining it raised in full line position, Fig. 1, and as also shown in Fig. 2, when the shipper lever is in running position, with the brake released.

When the shipper lever is moved to stopping position, Fig. 3, the toe $b'$ is lowered to release the brake actuator, thereby permitting the latter, acting by virtue of the weight W, to apply the brake automatically, whether the movement of the shipper lever is effected automatically or by hand.

It is very desirable that the brake may be released while the loom is stopped in order that the weaver




may move the operative parts of the loom by hand, and for this purpose there is provided a disk like hub $c$, having a cam $c'$ on its periphery and a non-radial arm $c^2$, secured to or forming a part of the cam, the outer end of the arm being enlarged to increase the weight, as at $c^3$, and serve as a handle. The hub is mounted to rock freely on the shipper lever fulcrum $b^x$ between the said lever and the ear $b^2$ of the stand $b$, said ear having thereon a stop $b^3$ to coöperate with the face on the inner end of the arm $c^2$, limiting its movement in one direction. Movement of the controlling member in the other direction is limited by engagement of the face of the arm $c^2$ with the straight edge of the ear $b^2$ as shown in Figs. 2 and 3.

The lever arm $a$ has a laterally extended finger $a^5$, which projects above and in the plane of the hub $c$ and its cam $c'$, and when the loom is running the toe $b'$ holds up the arm $a$, the finger $a^5$ being out of engagement with the manual controlling member, as shown in Fig. 2. When the shipper is in stopping position, Fig. 3, however, the release of the brake actuator by the toe $b'$ permits the finger $a^5$ to rest upon the hub $c$, the normal position of the controlling member relative to the shipper lever being shown in Figs. 2 and 3.

If now it is desired to release the brake without starting the loom the weaver grasps the handle $c^3$ of the controlling member and turns it up, thereby bringing the cam $c'$ up over for a little past the dead center—viz:—the fulcrum $b^x$—the cam acting on the finger $a^5$ and raising the lever arm $a$ to release the brake.

The position of the cam above center and the pressure of the brake actuator thereupon retains the controlling member in such position until the shipper lever is returned to running position, whereupon the cam $c$ is withdrawn from the finger $a^5$, the actuator is engaged and held inoperative by the toe $b'$, and the controlling member returns by gravity to normal position.

Spring S, attached at one end to the loom frame and at the other end to the shipper lever, acts to throw the latter when released from its holding notch.

The slot and stud connection between the brake rod $d$ and the frog F permits the brake actuator to apply the brake when the shipper lever is knocked off by reason of failure of the filling or by hand without operating the frog. Stop $b^3$ limits the movement of the manual controlling member when operated to release the brake while the loom is stopped. *(Draper Co.)*

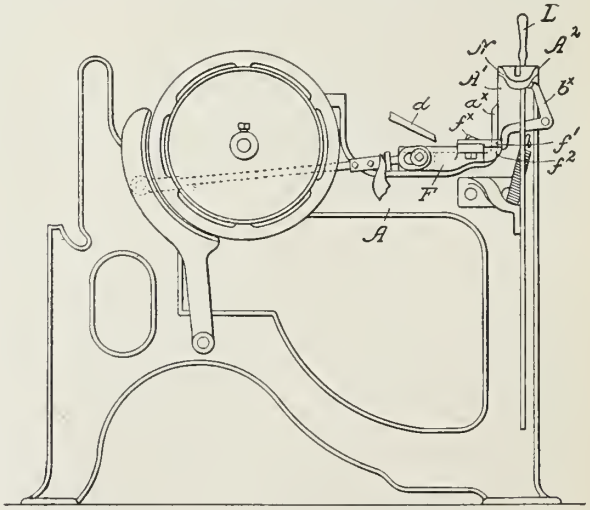
## PROTECTOR MECHANISM FOR DRAPER LOOMS.

The protector mechanism usual on back binder looms includes a frog lift mounted on a sliding frog adapted to travel on the loom side, the dagger engaging the frog lift when the shuttle is improperly boxed to thereby stop the loom. Engagement of the frog lift by the dagger causes a great strain on all the parts, and as it is highly desirable to preserve absolute alignment in the travel of the frog and also prevent tipping thereof, the new mechanism has been designed.

The illustration is a left hand side view of a loom with the new mechanism applied thereto.

A is the loom frame, $A^2$ the breast beam, having the holding plate N for the shipper lever L to actuate the belt shifting devices, (not shown), and the knock off lever $b^x$ for the shipper lever, adapted to be operated by an arm $f'$, fast on an offset of the frog F, mounted to slide on the loom side.

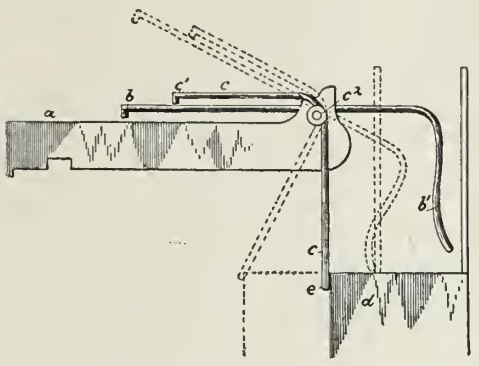
$f^x$ is the frog lift as mounted on the frog and to be engaged at times by the dagger $d$, (only partially shown in illustration). The forward end of the frog F is provided at the sides with two separated projections $f^2$, extended forward beneath two opposite and laterally extended lugs $a^x$, formed on the upright



corner portion A′ of the loom frame. As the frog slides on its support the fixed lugs above the projections $f^2$ prevent tipping of the frog, and, passing at opposite sides of the part A′ of the frame, insure the movement of the frog in proper alignment without any opportunity to twist. *(Draper Co.)*

## CATTERALL'S LOOM FORK.

The object is to produce a very sensitive loom fork, and which is shown in the illustration in connection with a portion of the lay of a loom.




*a* represents the body of the loom fork and in which is pivoted the fork *b*. On the side of the body *a* of the loom fork is pivoted at $c^2$ the wire *c*, having a weighted end *c'* which end extends at a right angle over the back end of the fork *b*. *d* represents the lay of the loom.

Just before the tines *b'* of the fork *b* engage the "filling" the lay *d* of the loom strikes the end *e* of the wire *e* and forces it to the rear, thus raising the weighted end *c'* from contact with the rear end of the fork *b*, and thus allows the rear end of the fork to rise by the exertion of the least possible force of its tines *b'* on the filling. *(John Catterall, New Bedford, Mass.)*

## SCHAEFER AND HINKEL'S STOP MOTION FOR COTTON LOOMS.

The mechanism refers to looms having two or more boxes on one side and a single box on the other side; providing means whereby whenever the shuttle is absent from the box in which it should be at either end of the lay the loom will be stopped, and so, also, should two boxes occupying a position at the level of the race of the opposite ends of the lay each have a shuttle then the loom will be automatically stopped.

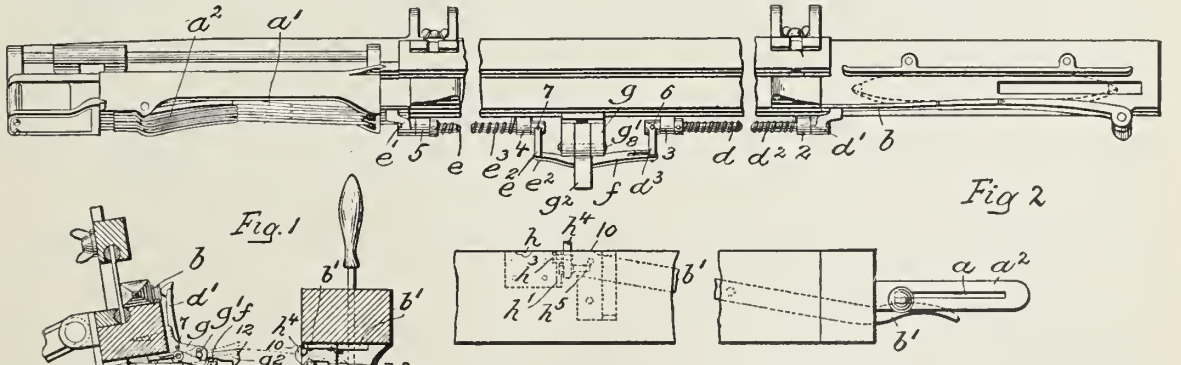



Fig. 1 shows the lay and breast beam of a loom in section, with the mechanism added; Fig. 2 is a top view of the lay with the mechanism applied thereto, also showing a part of the lay.

The lay is provided at its under side with ears 2, 3, 4, 5, of which 2 and 3 contain a binder shaft *d*, having at one end a binder finger $d^1$, which is kept against the binder *b* of the single box by the spring $d^2$. The opposite end of the shaft *d* has a projection $d^3$, having a hook which is fixed to the shaft by a set screw 6. At the opposite end of the lay the ears 4 and 5 receive a second shaft *e*, which has attached at one end a binder finger $e^1$, being held in position against any box $a^1$ which is used, by a spring $e^3$, and at its other end has a projection $e^2$, held in place by a set screw 7.

These two shafts are connected by a dagger rest *f*, which is pivotally mounted at one end of the projection $e^2$, and at the other end has a slot 8, which is entered by the projection $d^3$.

The lay has attached to it a casting *g*, having a pivot or stud $g^1$, upon which is mounted a double acting bunter composed of an arm $g^2$, having a hook $g^3$ projecting from its under side. This bunter is acted upon near its pivot by a spring $g^4$, which normally serves to depress the acting front end of the bunter.

To the under side of the breast beam, stand *h* is attached, having a depending apron $h^1$, slotted at $h^2$, said slot receiving in it an adjustable stud $h^3$, upon which is mounted a lever $h^4$, having adjustably connected at its lower end, and extended therefrom, a stud $h^5$. The upper end of this lever $h^4$ stands normally close to and bears against the end 10 of the knock off lever $b^1$, and the head 10 of the said knock off lever is notched, as shown in Fig. 1, where it will be seen that there is a space between the grooved edge of the knock off lever and the projecting stud $h^5$.

When the shuttle is in its proper position in one of the shuttle boxes opposite the level of the race of the lay, whichever box the shuttle is in will cause the binder of the box having the shuttle to turn the rock shaft *d* or *e* and depress the projection $d^3$ or $e^2$, such depression of either one of said projections singly lowering the dagger rest *f*, so that the double acting binder moves backward and forward in the space between the end 10 of the knock off lever and the projection $h^5$, and subsequently the knock off lever is not moved. Should, however, the shuttle be absent from either box, then the spring $d^2$ or $e^3$, acting upon the shafts *d* or *e*, will turn the binder finger $d^1$ or $e^1$ inwardly, moving the binder *b* or *a* into the shuttle box, such movement causing whichever projection $d^3$ or $e^2$ is moved to lift the dagger rest *f*, so that it, acting by its projection $f^2$ against the under side of the bunter, will lift the same, so that in case a shuttle be absent from both boxes the end 12 of the upper part of the bunter will meet the end 10 of the knock off

lever and turn it to release the shipper handle from its usual notch in the holding plate $a^2$ and thus stop the loom.

Should the shuttle boxes opposite the level of the race of the lay have a shuttle in them, then the binders of both of said boxes, held out by the shuttles in them, will act to turn the binder fingers outwardly, lowering both the projections $d^3$ and $e^2$, which move downwardly the rest $f$, permitting the spring $g^4$, acting with the gravity of the bunter, to lower the bunter so that its hooked part $g^3$ in the back stroke of the lay will catch the projection $h^5$, turn the lever $h^4$ in the direction of the arrow just below it, Fig. 1, causing the upper end of said lever to meet the end 10 of the knock off lever and release the shipper handle from the loom and thus also stop the loom. *(Gustave Schaefer and Fred'k Hinkel, Clinton, Mass.)*

## LAHUE'S PROTECTOR STOP MECHANISM.

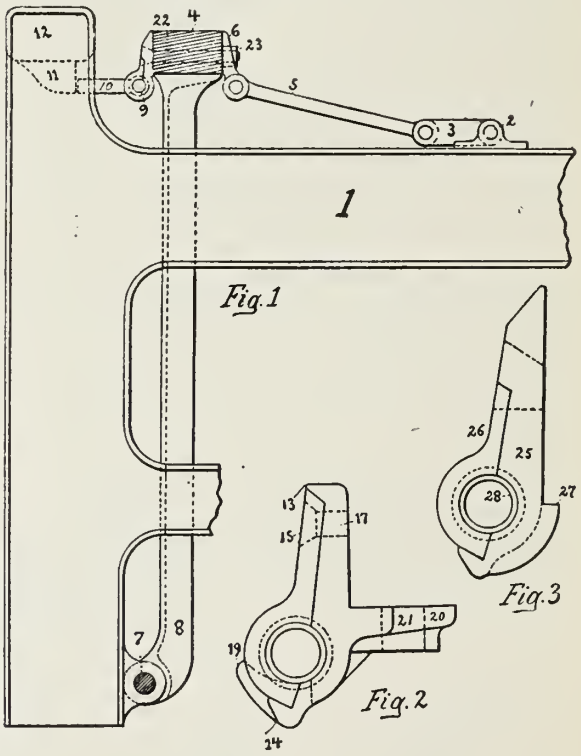
This mechanism relates to the protector rod stands, and may be applied to looms that have otherwise the ordinary lay mechanism.

Fig. 1 is an end view of the lay part of a loom, so much being shown as to explain the mechanism. Fig. 2 is an end elevation of the middle stand, and Fig. 3 an end elevation of the end protector rod stand.

1 indicates the loom frame supporting the bearing 2 for the crank 3 that drives the lay sill 4 through the medium of the pitman 5 journaled to the bracket 6 attached to the sill.

The frame 1 also supports the bearing 7 of the lay sword 8, on which the sill is mounted. Along the front of the sill runs the protector rod 9, having the dagger 10, which normally swings idle with the beat of the lay, but which upon the shuttle failing to enter its box is automatically elevated and strikes the shoulder 11 on the breast beam 12, stopping the beat till the fault can be remedied.

A great deal of wear comes on the protector rod 9, because it is rocked at each beat, and therefore it soon wears loose in its stands. When this has occurred, it is also found that the thrust of the dagger when it strikes the shoulder 11, is apt to spring up the center of the rod and buckle it. Thus from various causes it is frequently necessary to remove and replace the rod; necessitating the removal of the stands, at least the end stands, and the loom remains idle for some time, again all the stands must be removed when they become much worn. To prevent not only the destruction of the stands by wear, but also the ruining of the rod by buckling, and to facilitate the replacing of the worn rods, are the purposes of the new mechanism. The middle stand of the device has two bearings, with a space between for the play of the dagger. Instead of resting the rod in channels in the stand, thereby causing wear upon the stand itself, bushings are slipped upon the rod and the stand is provided with sockets, in which the bushings rest. A cap 15 interlocks with the socket by fitting at the lower edge into a channel in the stand, a lip adjacent to said channel being formed to overlap the said lower edge and retain the latter in place. Through the upper part of the cap and stand is a screw hole 17, through which a screw is turned into the lay sill. Above this screw hole 17 the stand has an offset 13, which projects over the upper edge of the cap 15. The offset 13 and lip 14 coöperate to secure the cap 15 from movement, and therefore assist in retaining the protector rod in place. In applying the cap 15 to the stand its lower edge is inserted behind the lip 14, then its upper edge is swung in under the offset 13 and finally the screw is applied in the screw hole 17, clamping the parts. In its constant vibration the protector rod exerts force outward and upward. The outward strain is taken and neutralized by the lip 14, while the upward strain is similarly taken and neutralized by the offset 13. Thus no racking action comes on the screw and the cap cannot work loose. The bushing is held securely in the stand, but may be instantly released by loosening the screw and disengaging the cap. To prevent longitudinal sliding of the bushing the cap and socket are cast with a rim at each end of the space in which the bushing will lie. Two horns 19 are cast upon the stand and between these the dagger plays. The stand opposite the base of the dagger is concave, so that when the dagger comes against the shoulder on the breast beam there is a solid backing to receive the thrust in whatever direction the thrust may act, whether exactly horizontal or glancing up or down. Therefore no buckling can take place. A flange 20 projects beneath the lay sill, and a bolt passes up through a hole 21 therein to secure the same to the sill. This bolt need not be loosened or disturbed in replacing the bushings or rod. All that need be done is to loosen the cap screws sufficiently to disengage the caps, when the rod and the bushings thereon may be lifted out, changed and replaced with but a brief delay of stopping the loom.




The end stand is made up of substantially the same parts, but holds a single bushing instead of two. This stand has no flange under the sill, but is secured by a single bolt 22 and nut 23, passing through a wedge shaped hole in the stand proper 25 and cap 26. A mere shoulder 27 projects under the sill. The bushing 28 lies in the socket of the stand and is clamped by the cap exactly as the bushings of the middle stand. To remove the bushing, all that is necessary is to loosen the nut 23, when the cap may be disengaged. *(Moses M. Lahue, Lowell, Mass.)*

## HARRIMAN'S SLACK ALARM AND STOP MOTION.

The motion relates to looms for weaving elastic goods, and has for its object to give an audible alarm when any of the rubber warp threads become slack and to stop the loom when such a rubber warp thread is broken.

In elastic goods the rubber threads in requisite numbers must be introduced under tension in order that the finished fabric may not be sleazy and inelastic. Each narrow ware loom may be considered as a number (about twenty) of looms, each weaving a separate web and all having a mainshaft, cam shaft and lay in common, and the number of elastic threads in such a loom is so great that it is almost impossible for the weaver to watch them all.

Fig. 1 is a left side elevation of part of a loom embodying the new mechanism, Fig. 2 is a front elevation of a part of the same near the left side thereof; Fig. 3 is a front elevation of parts of the rear cross girths and vibrator and showing three drop wires, one in its normal raised position, another in position to operate the slack alarm, and a third in position to operate the stop motion; Fig. 4 is a plan of the parts shown in Fig. 3; Fig. 5 is a plan of a part of the loom frame, breast beam and lay, said breast beam and lay being broken away to show parts of the stop motion; Fig. 6 is a vertical section on the line 6-6, in Fig. 3 of the vibrator and stop cord; Fig. 7 is a front elevation of a part of the lay, showing the retaining lever, the lever engaged thereby, and the stud which disengages said levers; Fig. 8 is an isometric perspective view of an elastic warp thread and the upper part of a drop wire.

A indicates the frame, B the main or crank shaft, $b$ the fast pulley and $b'$ the loose pulley on said shaft B; D is the cam shaft having a gear $d$ engaged by a pinion $b^2$ on the crank shaft B; E indicates the lay as pivoted at $e'$ on the frame A and connected by pitman

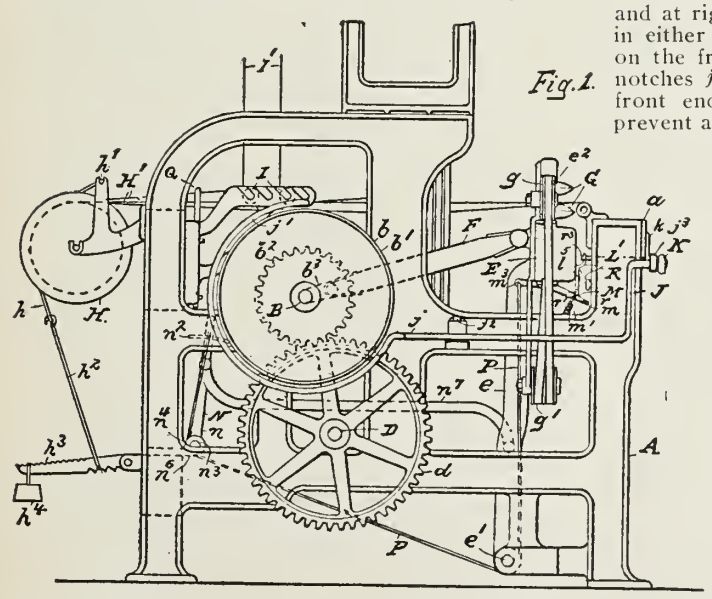


Fig. 1.

F to a crank $b^3$; G are the shuttles running on the lay beam $e^2$ of said lay and which are driven by the rack and pinion device operated by reciprocating belts $g$ $g'$; H is a warp beam on which the rubber threads H' are wound, $h$ is the tension apron secured to the tension apron roll $h'$, $h^2$ is the tension link, $h^3$ the notched tension lever, $h^4$ is the tension weight adjustable on said lever $h^3$, and I are the idle rolls which change the direction of the cotton warps I'. The loom is also provided with a belt shipping fork $j$, between the tines $j'$ of which the main driving belt (not shown) runs, said fork being a part of or rigidly secured to the rear end of the belt shipping lever J, which lever

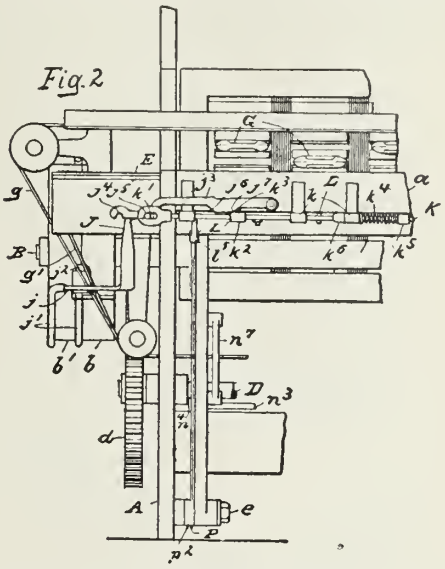


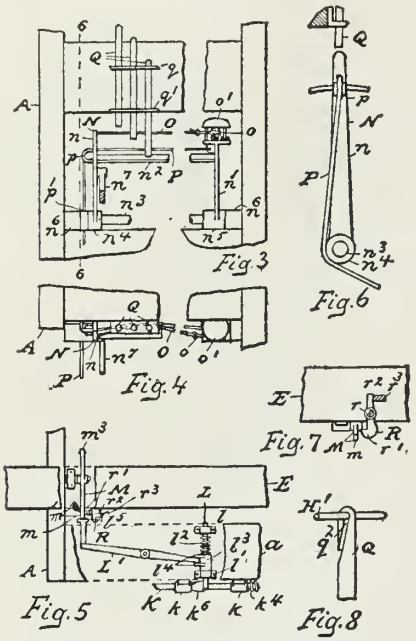
Fig. 2

J is pivoted on a stud $j^2$, rigidly supported on the loom frame A and extends to the front of the loom where it can be operated by hand to throw said driving belt from one to the other of the pulleys $b$, $b'$ in order to start or stop the loom.

The front end of the shipping lever J is horizontal and at right angles to the breast beam $a$, and is held in either of its positions by a latch lever $j^3$, pivoted on the front of said breast beam $a$ and having two notches $j^4$, $j^5$, Fig. 2, each adapted to drop over the front end portion of said shipping lever and thus prevent an accidental movement of said lever. A long rod K, which slides in brackets or loops $k$ is secured to the front of the breast beam; this rod has a loop or slot $k'$ surrounding the front end portion of the shipping lever and has also a collar $k^2$ fixed on said rod K and is provided with a finger $k^3$, adapted when the rod is pushed endwise to strike at the beginning of its movement on the under side of one of the inclines $j^6$, $j^7$ with which the latch $j^3$ is provided and to raise the corresponding notches $j^4$, $j^5$, out of engagement with said shipping lever, said slot $k'$ being long enough to allow of said latch being thus raised before the corresponding end of said slot $k'$ strikes said shipping lever.

A spring $k^4$ surrounds the rod K and is compressed between a collar $k^5$, fast on said rod, and one of the brackets $k$, in which said rod slides, the expansion of said spring shifting the main driving belt onto the loose pulley $b'$ from said fast pulley. A tapering collar $k^6$ is also secured on rod K, which when said rod is moved to shift said belt onto the fast pulley to start the loom, crowds back and passes a catch or bolt L, Figs. 2 and 5, which slides in bearings $l$ $l'$, bolted to the under side of the breast beam, said bolt being then thrown forward by the expansion of a

spring $l^2$ surrounding said bolt L and compressed between the bearing $l$ and a collar $l^3$, fixed on said bolt in such a manner as to prevent a return movement of said collar $k^6$ and rod K. A lever L′ is pivoted on the under side of the breast beam, one end of said lever L′ entering between ears $l^4$, with which the collar $l^3$ is provided, and the other end $l^5$ of said lever L′ being bent downward into a position to be struck by the front end $m$ of another lever M, pivoted on the lay,




when said front end $m$ is raised sufficiently for that purpose, said front end $m$ being normally held down by a spring $m'$ (shown in Fig. 1 as a spiral spring), connecting the front arm of said lever M and the sword $e$ of the lay E. A vibrator N, consisting of two parallel arms $n$, $n'$, connected by a cross bar $n^2$, is provided at the lower ends of said arms with hubs $n^4$, $n^5$, which loosely surround a horizontal shaft $n^3$, supported in brackets $n^6$ on the frame A, said vibrator being connected to the lay by the rod $n^7$ and therefore oscillated by the movement of said lay. Above the vibrator N are as many drop wires Q as there are rubber warp threads H′, each being supported on one of said threads H′ and held in position indicated, at the left, in Fig. 3. Each drop wire Q is represented as a straight wire sliding in horizontal guides $q$, $q'$ (see Fig. 3) secured to the frame of the machine, and each drop wire having at its upper end a hook $q^2$ to reach over a rubber warp thread H′. (See Fig. 8.) An inextensible cord O is attached at one end to one arm $n$ of the vibrator and at the other end to the operating lever $o$ of a mechanical bell of such a construction that the pulling of said cord will ring the bell $o'$.

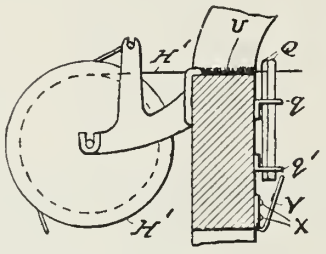
Upon the breaking of a rubber warp the corresponding drop wire falls still lower into the path of cord P, which is arranged below the cord O, and is fastened at one end to the arm $n^1$ of the vibrator N, from which arm $n^1$ said cord P passes over an idle pulley $p$, journaled on the opposite side of said vibrator, then under another idle pulley $p^1$ journaled on the shaft $n^3$ of said vibrator, then under another idle pulley $p^2$, journaled on the lay stud or center $e$, the other end of said cord P being attached to the rear end $m^3$ of the lever M.

The part of the cord P between the arm $n^1$ and the pulley $p$ is normally horizontal, straight, and of uniform tension, so that said cord P causes no movement of the lever M, except when the proper movement of said cord P with the vibrator is interrupted by a fallen drop wire Q, (see at the right in Fig. 3), when said cord is bent between the arm $n^1$ and the pulley $p$, causing the rear end of the lever M to be depressed and the front end $m$ of said lever M to strike the end $l^5$ of the lever $L^1$ in such a manner as to draw the bolt L backward out of engagement with the tapering collar $K^6$ and to allow the rod K to be moved by the spring $K^4$ to shift the belt onto the loose pulley as before described.

The stopping of the loom would then take place if the drop wire Q fell in front of the cord P; but to prevent this, a retaining lever or latch R is used, which is pivoted at $r$ on the lay beam E and is provided at its lower end with a hook $r^1$ beveled on its under surface, which hook is pushed aside by and engages the front arm of said lever M (when said arm is raised) and holds said arm in a raised position until the upper arm $r^2$ of said lever R, just at the end of the forward movement of said lay, strikes the beveled rear end of a backwardly projecting stud $r^3$, secured to the lay beam, and is thereby thrown out of engagement with said lever M.

An improvement on this warp stop motion is shown in the accompanying illustration, representing an elevation of the rear part of the loom (see also Fig. 1 of the preceding article), the frame being partly removed to show the plush or pile fabric over which the rubber warps are drawn, showing also some drop wires and a contact plate as used in connection with an electrical battery, so that when a drop wire touches said contact plate, the same causes the ringing of the bell.

Examining illustration we find hung on the rubber warp threads $H^1$ drop wires Q (see also Fig. 8 of the preceding article) arranged to slide vertically in horizontal metallic guides $q$, $q^1$, and having hooks, which catch over rubber threads $H^1$ and are sustained by said threads when the same are kept at the proper tension; but when any rubber thread becomes slack or breaks the corresponding drop wire Q falls low enough to touch a corresponding contact plate V and thus closes an electric circuit in turn causing a buzz bell to sound until the tension of the slack thread is increased or a broken thread mended.




The body of each contact plate V is inclined in such a manner that the lower end of a falling drop wire scrapes thereon and cleans the surface thereof and thus makes a perfect contact therewith.

By means of slots and screws X the distance of the plates V from the lower ends of the drop wires may be adjusted to cause the alarm to sound at any predetermined amount of sag of the rubber threads $H^1$.

The pieces U of plush are supported upon a horizontal part or cross girth of the loom with the pile side up, and the rubber threads run over and in contact with said plush, pulverized chalk or equivalent material being placed on said plush and being retained thereon by the shaggy upper surface thereof, except so much of said pulverized material as adheres to the rubber threads. The action of the plush, either with or without the pulverized non-adhesive material, polishes said threads so that they do not adhere to each other. *(Josiah Harriman, Lowell, Mass.)*

# PICKING MECHANISMS.

## GOODLINE AND CLARK'S PICKING MECHANISM.

Picking shafts, as usually constructed, act as a fulcrum of a lever of the first order, the shorter end of which carries a picking roll actuated by a cam, the other end of the lever being attached to a picking lever which actuates the shuttle when the lever is moved by the cam to throw it across the warp. In order to keep the roll in contact with the lowest part of the cam after the picking takes place and preparatory to the next action of the picking, a spring is employed, one end connected to an arm of the picking shaft and the other end to some stationary part of the loom frame, so that when the cam actuates the picking shaft the spring is extended, thereby producing additional stress upon the spring.

As the picking takes place, as the spring is connected to one arm of the picking shaft and the cam which actuates the shaft is connected to another arm, it follows that considerable friction, and consequently loss of power, is expended upon the bearing of the shaft at that time, and to overcome this additional resistance the form of the cam is so shaped as to give a quicker motion to the shaft. The new mechanism is designed to obviate the additional friction upon the bearing of the shaft by encircling the end of the shaft with a spring, having one end secured to it and the other end to a fixed part of the loom frame. The end of the spring which is secured to the shaft may be adjustably connected thereto, whereby the stress of the spring may be properly proportioned to the resistance to be overcome to retain the roll in contact with the cam without unnecessary expenditure of power. By this arrangement of the spring we are enabled to use a cam with an easier incline than we otherwise could do.

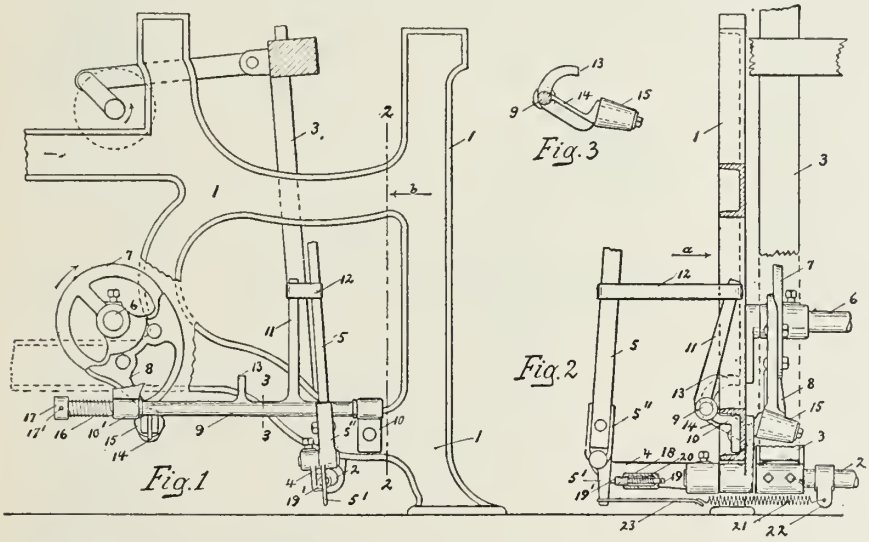



Fig. 1 is a side elevation of a portion of a loom side (the left hand side) and the new picking mechanism combined therewith, looking in the direction of arrow *a*, Fig. 2. Fig. 2 is a section on line 2-2, Fig. 1, looking in the direction of arrow *b*, same figure; and Fig. 3 is a section on line 3-3, Fig. 1, looking in the direction of arrow *b*, same figure, showing the picking arm and roll.

1 indicates a portion of the loom side (in this instance the left hand side). 2 is the rocker shaft, on which is secured the lower end 3 of the lay sword, and 4 is the rocker iron, secured on the outer end of the rocker shaft 2 and having the picker stick holder 5″ pivotally supported thereon and carrying the picker stick 5, which has a swinging motion at its upper end toward and away from the loom side. 6 is the bottom shaft, having the picking cam plate 7 fast thereon and carrying the picking cam 8, adjustably secured thereto.

Extending on the outside of the loom side 1 is the picking shaft 9, mounted to turn or rock in bearings 10, 10′, secured to the loom side. (See Fig. 1.) The picking shaft 9 has an upright arm 11 fast thereon, or integral therewith, which is connected with the picker stick 5 by a strap or connector 12. An inwardly curved arm 13, fast on the picking shaft 9, or integral therewith, acts as a stop to strike against the loom side and limit the inward rocking motion of the picker shaft.

The outer end of the arm 14 is fast on the picking shaft 9 or integral therewith, near the inner bearing 10′ thereof, and extends under the lower bar of the loom side and carries on its inner end a picking roll 15, mounted to turn thereon, which is of cone shape, with the smallest end of the cone farthest from the shaft 9. The roll 15 extends under and in the path of the picking cam 8 on the cam plate 7, to be engaged on its upper surface by said picking cam 8 as the bottom shaft 6 revolves, to communicate motion to the picking shaft 9 and through arm 11 and connector 12 to the picker stick 5, to drive the shuttles through the shed.

The cone shaped roll 15 is considerably longer or wider than the thickness of the picking cam 8, as shown in Fig. 2, and the position of said roll 15 on the arm 14 relatively to the picking cam 8 is such that the first engagement of said cam 8 with the roll 15 in the operation of the loom will be with the smaller end of said roll, and the last engagement will be with the larger end of the roll—that is, the arc of the circle through which the roll 15 on the arm 14 passes is such, relatively to the picking cam 8, that in the revolution of said cam and its engagement with said roll it will pass from the smaller end of said roll to the larger end at each pick of the loom, so that there will be a gain of movement of the roll and the roll arm 14, and consequently of the picker stick 5, through connections to the picking shaft 9, corresponding to the inclination of the roll surface 15.

A coiled spring 16 encircles the inner end of the

picking shaft 9 beyond the bearing 10′ and is secured at one end to said bearing and at its other end to a collar 17, adjustable on the shaft 9 by a set screw $17^1$, and acts to rock said shaft and keep the picking roll 15 in contact with the cam plate 7 and picking cam 8 as the same revolves. The position of the spring 16 on the picking shaft 9 relatively to the arm 14 is such that the action of said spring on the shaft 9 is in line with or very near the point where the arm 14 is connected with said shaft, so that the action of the spring is applied directly to keep the roll 15 in contact with the cam plate 7 and picking cam 8 instead of at a distance.

The rocker iron 4 is provided with a tube 18 for holding the spring actuated pin 19, having a spiral spring 20, encircling the same, to push the outer enlarged end 19′ of the pin 19 out from the outer end of the tube 18 (see Fig. 2) to be engaged by the downwardly extending end 5′ of the picker stick holder 5″ and act as a shuttle easer, for when the point of the shuttle thrown from the opposite side strikes the top end (not shown) of the picker stick 5, the end 5′ is carried into contact with the end of the spring actuated pin 19, and thus eases the shuttle and prevents it from rebounding.

A spring 21, secured at one end to a collar 22 on the rocker shaft 2 and connected at its other end by a link or wire 23 with the lower end 5′ of the picker stick holder 5″, acts to draw back the picker stick 5 and keep the connector 12 taut and the picker stick 5 in its outward position.

The picking shaft is supported near its back end by a bearing, and the picking roll arm is at one side of said bearing and a coiled spring at the other side, by which construction the spring acts directly upon said arm to keep the picking roll in contact with its cam without such friction in the bearings as results from applying a spring at the bottom of the picking stick in the ordinary way.

It will be noticed that the vertical arm 11 will move from a vertical position, and the inwardly curved arm 13 and the arm 14, with its picking roll 15, will move downward when the shaft 9 is moved by the picking cam 8 to throw the shuttle, and the spiral spring 16, can be so accurately adjusted by its collar 17 as to just overcome the gravity of the parts when the picking roll 15 has been moved by the picking cam 8 to return, or keep the roll in contact with the cam plate 7—that is, the spiral spring 16 will just balance the gravity of the parts and keep the picking shaft in its normal position; but when the shaft is actuated by the picking cam 8 the momentum of those parts above named will not be in any degree overcome by the spiral spring 16. Consequently this momentum is an important factor in throwing the shuttle, and permits the construction of the picking cam 8 to be made of a much easier incline to throw the shuttle properly than in looms with picking shaft as commonly constructed. In addition to this the change of diameter of the picking roll 15 from the small part of the roll when the picking shaft is first actuated to the larger diameter at the end of the movement is also of material advantage in producing a still easier incline on the picking cam 8. Either of these parts materially assists the picking, and both combined give a still better result.

The arrangement of the picking shaft on the outside of the frame with its inwardly projecting arm 14 on the inside permits of so arranging the arm 11 as to be conveniently connected by the connector 12 to the picking stick 5, and also to permit the cam plate 7 to be supported in immediate proximity to the supporting box on the cam shaft, so as to give the greatest rigidity to the cam plate 7 when the picking cam 8 is operating the picking shaft. This arrangement also permits the vertical arm 11 to be in its proper relation to the picking stick 5, so as to draw the picking stick forward at the proper time to throw the shuttle without interfering with the usual construction of the lathe sword or standard which supports the lay, as would be the case if the picking shaft was inside of the frame. *(Crompton and Knowles Loom Works.)*

## THE KNOWLES SINGLE BOX PICKING MOTION.

This picking motion relates to single box looms used mostly for cotton, silk and other fabrics that require only one shuttle and where there is no picker rod to guide the picker in a horizontal direction forward and back in its course. In this class of looms the rocker shaft or pin on which the rocker iron of the picker stick is secured must be parallel with the lay. Any slight variation in level of the rocker shaft or pin from its proper position will cause a variation in the parallel motion of the picker at the point where it engages the shuttle.

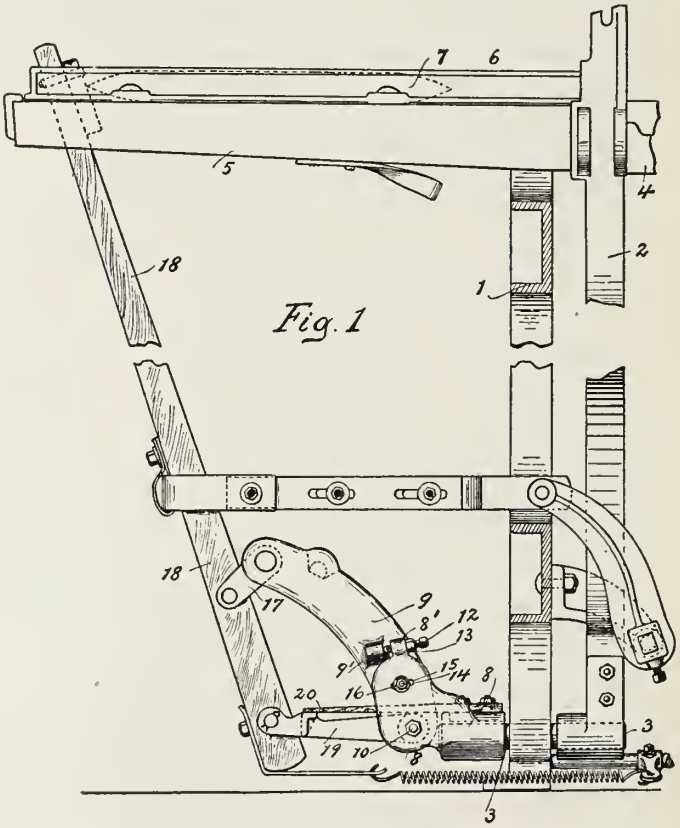


Fig. 1

The object of this picking motion is to provide means for overcoming any variation from its proper level of the rocker shaft or pin on which the rocker

iron of the picker stick is secured and to obtain an exact horizontal or parallel movement of the picker where it engages the shuttle in case there is any such variation. Heretofore in this class of picking motions the supporting arm of the rocker iron on which the picker stick is supported, has been made integral with or rigidly attached to the rocker iron, so that the position of said supporting arm relatively to the rocker iron could not be varied.

Fig. 1 shows one end of the loom frame, having this picking motion attached, showing said motion "at rest." Fig. 2 corresponds to Fig. 1, but shows

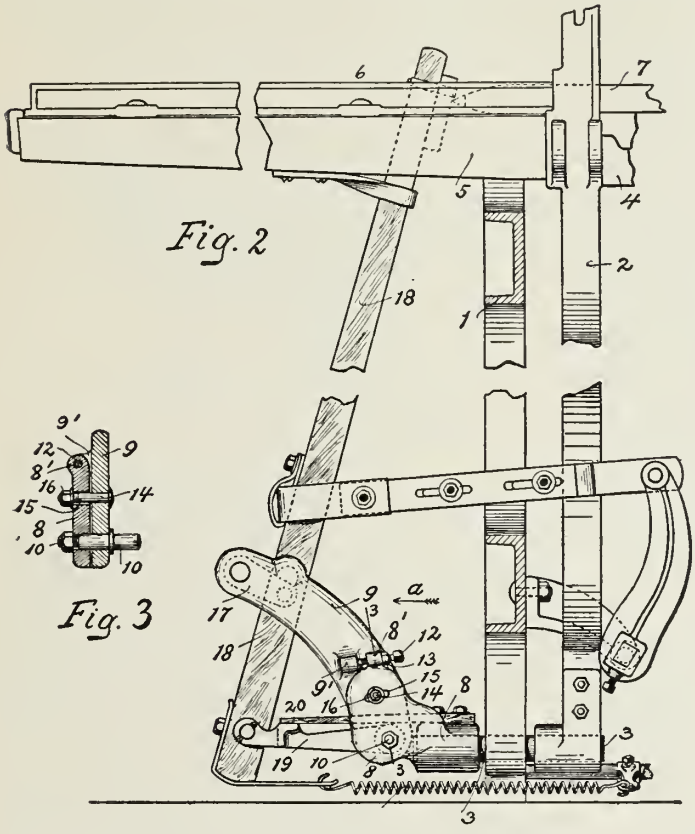



Fig. 2

Fig. 3

the picking stick and other parts of the mechanism in reverse position, *i. e.*, "at end of the pick." Fig. 3 is a cross section through the rocker iron on line 3-3 Fig. 2, looking in the direction of arrow *a*, same figure.

1 is the loom side, 2 the lay sword fast at its lower end on the rocker pin 3, mounted in bearings in the lower end of the loom side 1. 4 is the lay, and 5 the projecting end of the lay, carrying the shuttle box 6 for the shuttle 7. (Shown in dotted lines.)

8 is a rocker iron fast on the rocker shaft or pin 3. 9 is the supporting arm of the picker stick and which arm is made separate from the rocker iron 8 and is supported thereon on a pin 10, thus permitting its adjustment.

This adjustment is obtained by a screw 12, screwing in and out of a screw threaded lug 8', on the rocker iron 8, with its inner end bearing against a projection 9' on the arm 9. A checknut 13 holds the screw 12 in its adjusted position.

After the arm 9 has been adjusted on the rocker iron 8 it is held in its adjusted position by a bolt 14, secured to the arm 9 and passing through a hole 15 in the rocker iron 8, and a nut 16 is screwed onto said bolt. The outer end of the arm 9 is connected by a link 17 with the picker stick 18, one end of the link being pivotally attached to the arm 9 and the other end to the picker stick 18. The lower end of the picker stick 18 is pivotally attached to the outer end of an arm 19, the inner end of which is pivotally attached to the rocker iron 8 by the pin 10.

As the picker stick is pulled forward the link 17 gives it a downward and upward curved motion which combined with the forward movement of the stick gives the picker a horizontal movement, the same as if it was running on a picker spindle.

A flat spring 20 is secured at one end to the upper end of the rocker iron 8, and at its other end bears on the outer end of the arm 19 and acts as a check to receive the shuttle and also as a check to the forward motion of the picker stick. *(Crompton and Knowles Loom Works.)*

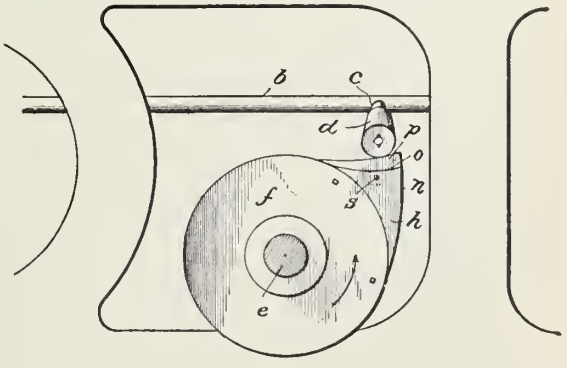
## PICKER-CAM POINT FOR CROMPTON COTTON LOOMS.

In looms of this type the picker cam is generally formed in two parts, one of which comprises a disk on a shaft, and the other consists of a casting weighing about three pounds, bolted to said disk. When the striking surface of this casting, *i. e.*, cam becomes worn, said casting must be removed and replaced by a new one; besides this, it is always more or less difficult to secure the most durable wearing surface on such a heavy casting.

The new cam is made in three parts, viz., the disk on a shaft, as before, and a picker cam made of two parts which are connected together and then attached to the rotary disk previously referred to. The illustration represents an elevation of so much of the loom as is necessary to illustrate the construction, application and working of this picker cam point.

*b* in illustration indicates the picking shaft of the loom, said shaft being rocked in one direction on its axis by means of the cam and in the other direction by means of a spring (not shown). *c* is the picker arm for the picker roll *d*. The cam shaft *e* carries the disk *f*, which carries the cam point.

The block *h* is formed with a concave edge to rest




on the periphery of the disk *f*, and with a flange which overlaps the side of the disk, said flange being

formed with a groove to receive a rib of the disk and with holes through which bolts pass to secure the block permanently to the disks. The block *h* is formed with a convex edge *n*, over which the roll *d* rides in returning from the tip of the cam, and with a concave edge *o*, against which the picker point proper or striking surface piece or facing block is held. This facing block *p* has a convex rear edge to fit and rest against the concave edge *o* of the supporting block *h*, the latter being provided with a groove in one side to receive a lug formed at the rear of the facing block. A bolt *s* passes through a hole in the lug and a hole in the supporting block to hold the two blocks together.

It will be observed that the supporting block *h* is of an approximately triangular shape and so secured to the disk *f* that when the facing block *p* is in position and the disk rotated in the direction of the arrow in illustration, the force of the blow and the wear resulting therefrom when the loom is in operation are entirely taken up by the facing block, while the latter is firmly supported by an elongated backing comprising the block *h*. It will also be observed that owing to the shape of the two blocks and their connection, the impact against the striking surface is in a direction that merely tends to press the facing block against the supporting block, without tendency to move the former in an endwise direction. Hence the single bolt *s* is sufficient to unite the two blocks, and when a new facing block is required there is but one bolt to be removed and replaced.

The block *p* being comparatively small is easily handled and is cheaper than an entire cam or picker point made in one piece. Furthermore, said block *p* can be more readily case hardened than a large casting. Practically speaking, the block *h* will last as long as the disk *f* and may be considered as a permanent part thereof although being if required removable therefrom. *(Rob. M. Holt and Peter L. Hazlewood, Burlington, N. C.)*

## McMICHAEL'S PICKING MOTION.

This picking motion consists in a lever provided with a shoe, and operated by a wiper rotated by the crank shaft of the loom, and connections between the lever and the picker whereby the shuttle is thrown.

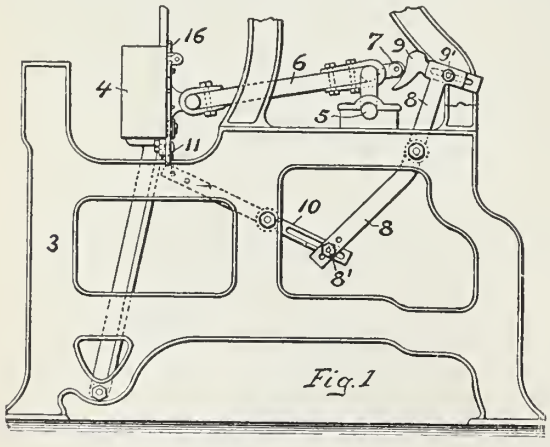


Fig. 1

The object is to substitute a short picker stick (as indicated by 11 in Fig. 2) in place of the one of usual construction.

Fig. 1 is a side view of parts of a loom, showing the said lever operated from the crank shaft, and connected with this short picker stick. Fig. 2 is a front view of part of a loom, partly in section, showing one end of the lay and the connections with the operating lever and the picker stick.

3 indicates one of the end frames of a loom, 4 the lay, 5 the crank shaft, and 6 the pitman connecting the lay with the crank of the crank shaft. 7 indicates a wiper, being a projection of the pitman provided with a roller; 8 is the picker lever pivoted on a stud secured to the frame 3 and provided at its upper end with a bracket to which a shoe 9 is adjustably secured by a bolt $9^1$. The shoe 9 has a curved face against which the wiper strikes and which it follows to move the shoe backward as the wiper rotates with the crank until it leaves the toe end of the shoe near the farthest backward movement of the wiper.

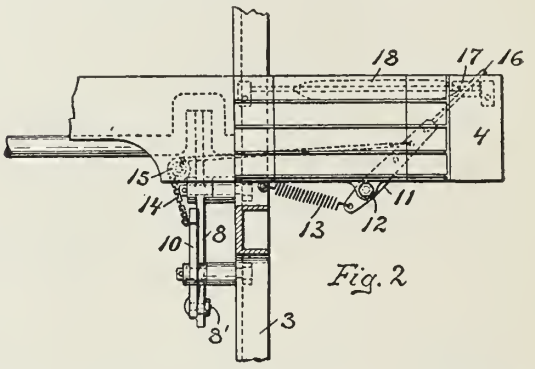


Fig. 2

The lower end of the lever 8 is connected by a bolt $8^1$ with the slotted end of the lever 10, pivotally supported on a stud secured to the end frame. The opposite end of the lever 10 is connected by a flexible connection with the picker stick 11, pivotally secured on a bracket 12, extending from the lay. The heel of the picker stick is connected with the lay by coiled spring 13.

The lever 10 is connected with the picker stick 11, by a cord 14 running over a roller 15, supported on the lay, and is connected with the picker stick 11 at one of its holes, the end 16 of the picker stick 11 extending through the picker 17.

It is desirable in the throwing of a shuttle to start the shuttle, and as it moves to increase the speed of the picker. This accelerated motion is secured in the new device by connecting the lever 8 with the slotted arm of the lever 10, by which the bolt $8^1$ secured to the end of the lever 8 slides in the slot of the lever 10 toward the fulcrum of this lever, and accelerates the movement of the opposite end of the lever, and thereby the movement of the picker 17 and the shuttle 18.

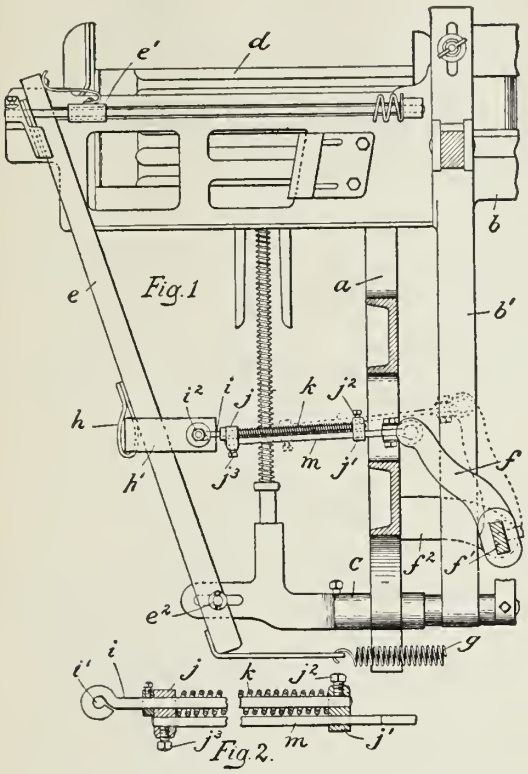
The picker mechanism thus described is located on each side of the loom, and is operated by the two cranks of the crank shaft. *(Wm. McMichael, Louis Ballou Sweatt, Woonsocket, R. I.)*

## AINLEY'S PICKING MECHANISM.

In the operation of looms it sometimes happens that the shuttle becomes wedged or obstructed in the shuttle box so firmly as to resist the stroke of the picker which would throw the shuttle across the loom. When this occurs, it usually causes a breakage of the picker staff or of some of its actuating parts, because of the unyielding construction of these parts.

The object of the device is to provide a yielding operating mechanism for the picker staff by virtue

of which breakage of the parts is obviated in case of obstruction offered to the picker. A further object




is to diminish the destructive or wearing effects due to the normal operation of the picking mechanism.

Fig. 1 represents, in side elevation, this picking mechanism and the adjacent parts in a loom. Fig. 2 represents, in vertical section, on a larger scale, particular features of this picking motion.

*a* designates a portion of the framework of the loom; *b* the lay or batten; *b'* one of the lay swords supporting the lay *b*, and *c* the rock shaft on which the lay oscillates. *d* designates the shuttle box, *c'* the picker, and *e* the picker staff, which is pivoted at $e^2$ to the rock shaft *c*, is actuated by the crank arm *f*, and is retracted after its shuttle throwing stroke by a spring *g*, connected with the heel of the picker staff.

In place of the rigid connecting piece or rod as generally used to connect the oscillating crank arm *f* with the picker staff *e*, there is provided a yielding connection constructed as follows: By means of straps or loops *h* and *h'* a rod *i* is attached to the picker staff *e* at a point above its pivot $e^2$, the said rod having an eye *i'*, through which passes a bolt $i^2$ on the strap $h^1$. The rod *i* passes through apertures in two blocks or collars *j j'* and is rigidly secured to the farther block *j'* by means of a set screw $j^2$. A second rod *m* is arranged below the rod *i*, passes through other apertures in the blocks *j j'*, being secured at one end to the block *j* by a set screw $j^3$ and at the other end to the crank arm *f* by means of a pivotal connection. A spring *k*, surrounding the bar *i*, is interposed between the blocks *j j'*, which constitute abutments therefor.

The arm *f*, is supported on a shaft *f'*, which is journaled in a bracket $f^2$ on the frame *a*. A cam operates to trip the arm *f* thereby swinging the picker staff *e* and throwing the shuttle. The spring *k* is of sufficient stiffness to overcome the inertia of the picker staff and shuttle, and the whole mechanism normally operates as though there were a rigid connection between the arm *f* and the picker staff *e*, except that the spring *k* diminishes the destructive wear caused by impact of the picker staff and by the rapid changes in the direction of movement. Should the picker become obstructed through wedging of the shuttle or other cause, the spring *k* will yield and permit the full travel of the crank arm *f*, while the picker staff is restrained. In this way breakage of the parts is prevented, the loom being stopped by the knock off mechanism before the arm *f* has made its next stroke.

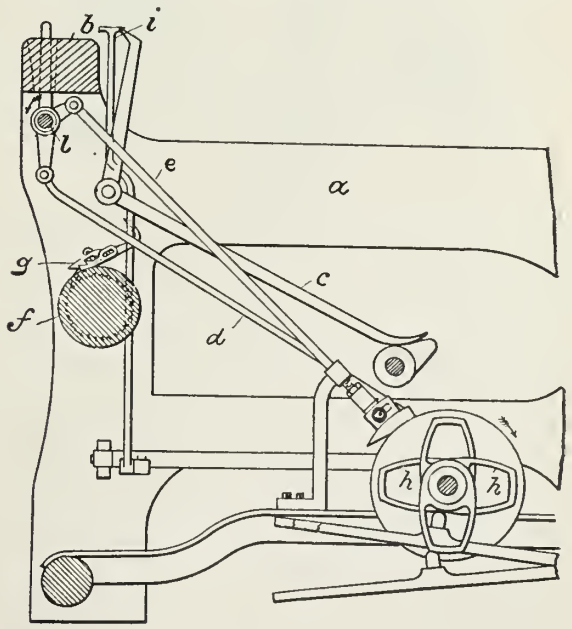
The tension of the spring *k* is regulated by changing the distance between the blocks or collars *j j'*. *(Albert Ainley, H. Earl Mabbett, Plymouth, Mass.)*

## PICK FINDING MECHANISM FOR NORTHROP CAM LOOMS.

The device applies to looms running on weaves requiring more than two picks for their repeat. In plain weaving, when the filling has been exhausted or broken, the right shed opens every other beat of the lay since there are only two picks in a repeat of the pattern, the filling being replaced by the automatic filling changer on the second pick after it has run out or broken, the fresh filling carrier thus always starting on its proper pick. However in weaves that have 3, 4 or 5 picks in a repeat, there would happen a mispick each time a filling carrier runs out or breaks on starting a fresh one, unless the loom is provided with a mechanism to prevent it and what is the object of this device.

The illustration is a partial vertical longitudinal section of part of a loom, showing a general plan of the mechanism.

*a* is the loom frame, *b* the breast beam, *c* the filling fork lever, *d* is the arm for indicating the cam that operates the shed that the filling runs out or breaks



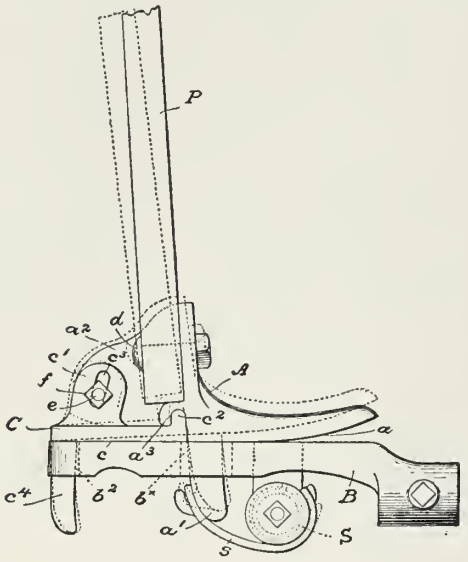

on. *e* is the arm for throwing the shuttle changing mechanism in action. *l* is the rock shaft on which is connected the filling stop motion and the pick finding device, *f* is the cloth take up roll, *g* the

ratchet pawl, $h$ are the treadle cams and $i$ is the lever for throwing the filling fork out of action.

The mechanism is so constructed that when the filling breaks or runs out the filling detector will indicate the same, at the same time through a connection of levers indicating the cam that operated the shed that the filling broke in, also throwing the take up and the filling motion out of action, without stopping the loom. The loom continues running without filling until the proper cam that was indicated comes around again, when the filling changing device is thrown into action by a connection of levers from the cam shaft, starting a fresh filling carrier in the proper shed. *(Draper Co.)*

## SYME'S PICKER STICK MOTION.

The object of the device is to be able to vary the inclination of the picker stick at the time the blow of the shuttle is received, and thus regulate the checking of the shuttle. When the impact of the shuttle and




stick is delayed, by inclining the stick outward, the checking effect upon the shuttle will be less than when the stick is moved inward, so that impact will take place sooner.

The illustration is a partial side elevation of a portion of a picker stick and its support, having the new motion applied thereto. Examining the illustration, we find the picker stick P attached at its lower end to a shoe A, by bolt $d$, the shoe having a curved sole $a$, which rests upon and rocks on the support B, the latter having a slot or opening $b^x$, through which extends a hooked lug $a'$, projecting from the bottom of the shoe. A spring S is attached at its free end by a strap $s$ to said lug, and acts to return the picker stick and shoe in its normal position, as shown in full lines in the illustration. The convex sole of the shoe does not extend beyond the bottom of the picker stick, but meets the flat face $c$ of the toe C, the toe having an upturned ear $c'$, which rests against an upturned rearward extension or web $a^2$, forming a part of the shoe, the latter having a downturned transverse hook $a^3$, which receives a transverse upturned lug $c^2$ at the inner end of the toe.

A bolt $e$ extended through a hole in the web $a^2$ of the shoe, passes through a slot $c^3$ in the ear $c'$ and receives a clamping nut $f$, the slot permitting adjustment of the toe on the shoe.

If the bolt is moved toward the upper end of the slot $c^3$, the picker stick will be swung to the right or inward toward the center of the breast beam, meeting the shuttle sooner than it will in the full line position shown, and the checking effect on the shuttle will be greater. By moving the bolt nearer the lower end of the slot the picker stick will be moved more to the left or outwardly, and checking will be decreased, so that the checking may be regulated by varying the inclination of the picker stick when it meets the shuttle.

The dotted lines show the position assumed by the parts when the picker stick is moved outward by the shuttle blow, the outer end of the toe acting as the fulcrum as soon as the parts move from full line position.

A prong $c^4$, depending from the plane face of the toe at its outer end, passes through an opening $b^2$ in the support B and positions the toe, preventing lateral movement thereof. *(Draper Co.)*

## PICKER STICK CHECK FOR SINGLE BOX COTTON LOOMS.

The object of the device is to provide a "creeping" picker stick check, in turn prolonging the life thereof.

The check is made as a complete loop of leather and of a length less than the stroke of the picker stick which travels within it, means being provided to effect an intermittent longitudinal movement, or "creeping" of the strap so that the portions at the end of the loop struck by the picker stick are constantly changing.

Fig. 1 is a transverse sectional view of one end of the lay of a loom, part of the picker stick, as well as the check. Fig. 2 is a horizontal section of the check and the picker stick.

A is the lay, B the picker stick, C are stands attached in front and back to the lay, held in place by screws $c^x$, each stand having formed upon it an outwardly extended upright boss $c$ and a depending guide stop $c'$, the two guide stops being located opposite each other and have their outer faces $c^2$ semi cylindrical, as shown in Fig. 2. A rod or pintle $c^3$ is rigidly held in and depends from each boss $c$ to receive upon it a cam $d$, eccentric exteriorly to the pintle $c^3$ and having ears $d'$ to receive the latter, the convex face of the cam being provided with retaining flanges between which the check strap D is held, the strap

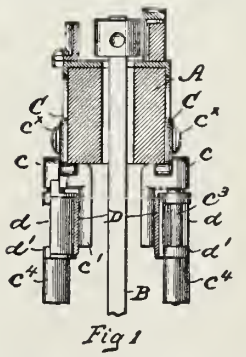



Fig 1

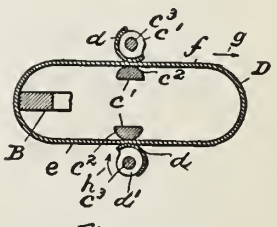



Fig. 2

passing between the convex surface of a guide stop $c'$ and the cam $d$ adjacent thereto. Owing to the eccentricity of the cam $d$ it will be manifest from Fig. 2 that if the picker stick strikes the right hand end of the loop D the pull of the strap along the side

*e* will tend to cramp still more tightly that side of the loop between the cam *d* and the adjacent guide stop *c'*, while the pull along the opposite side, as *f* of the loop, will tend to turn a part of the cam of less radius toward the coöperating guide stop, thereby releasing that side of the loop. As the side *e* is held and side *f* released, the latter side will creep or move longitudinally in the direction of arrow *g*, Fig. 2, as the picker stick completes its inward stroke. On its outward stroke, however, the operation is exactly reversed, for the cam *d* on the side *f* of the loop then cramps the strap, while the side *e* is free to move longitudinally by the impact of the stick on the outer end of the loop, and the strap will again move longitudinally and in the direction of the arrow *g*, this creeping serving to continually present a new surface to be engaged by the picker stick, thereby making the wear much more uniform and increasing the life of the check strap very materially.

A sleeve $c^4$ is secured, to the end of the fulcrum pintle $c^3$ beneath the lower ear *d'* of the detent member to support the latter, a coiled spring within the sleeve having one end attached thereto and secured at its other end to the detent member, the spring being so wound that it tends to retain the said member in operative position, turning it in the direction of arrow *h*, Fig. 2, to clamp the check strap. The spring opposes the longitudinal movement of the check strap hereinbefore described, and thereby imposes a friction drag upon it, the force of which can be readily regulated by varying the tension of the spring in the sleeve $c^4$, the adjustment being effected by withdrawing a pin and turning the sleeve $c^4$ in the desired direction and replacing said pin. As soon as the pull of the strap opposite to the stress of the detent spring is relaxed the spring acts to return the detent to normal position in close engagement with the check strap, and improper rotation of the detent against its spring is prevented by the part of the cam *d* of greatest radius engaging the check strap and pressing it against the guide stop *c'*.

When the picker stick is thrown against the end of the loop, a portion of the force of the blow is taken up in unclamping or releasing one side of the loop and the drag on the other side of the loop takes up the remainder, so that the picker stick is gradually checked as it reaches the end of its stroke. *(Draper Co.)*

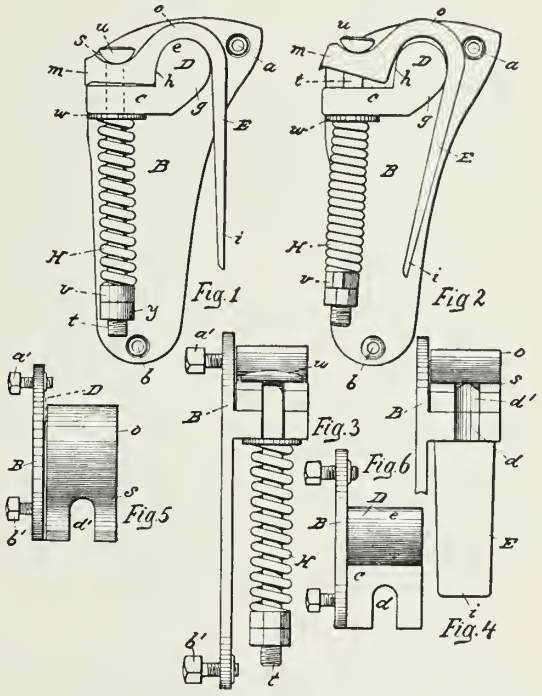
## ANDREWS' PICKER CHECK.

This picker check relates to that class of looms in which a shuttle at the commencement and end of its throw is in immediate contact with a picker in place of being struck by or striking a picker staff, and in which the picker staff is relieved from the wear incident to the blow of the shuttle, the novelty of construction of the device being the checking of the shuttle in a manner insuring its perfect working, and providing for its automatic return with the picker at the end of its throw to a proper position for the stroke of the picker staff.

Fig. 1 is a side elevation of the device detached, with the movable parts at rest. Fig. 2 is the same, with the movable parts changed by the blow of the picker and shuttle. Fig. 3 is a rear end elevation, with the movable parts in the position shown in Fig. 1. Fig. 4 is an end elevation, with a portion broken away, of a part of the device. Fig. 5 is a top plan view of the device as shown in Fig. 4. Fig. 6 is a top plan view of a part. Fig. 7 is a rear elevation of a lay box and part of a drop box with the device in position as combined with a loom; and Fig. 8 is a top plan view of a lay box and part of a shuttle box showing the device operatively combined with a loom.

In this check, while all of the advantages of absorbing the blow of the shuttle so as to preserve the filling are obtained, the picker and shuttle are placed in position for the stroke of the picker staff by the check itself.

B indicates a metal frame flat on both sides and provided with bolt holes *a b* and bolts *a' b'* adapting it to be screwed flat to the vertical wall of the lay box C, as shown in Figs. 7 and 8, where it is seen bolted on the inner side of the front wall of the lay box. Projecting at right angles to the inner face of the frame B and near its top is a lug D in the form of a polygonal block, which extends, when the frame is secured as shown in Fig. 8, nearly across the lay box. The lug D comprises a part *e*, with parallel upper and lower horizontal sides, a vertical slot *d*, centrally located in the part *e* and open to the rear, and from its front end an upwardly extending curved journal bearing *e*. All of one side of lug D is integral




with the frame B. The top of the journal bearing *e* is semicircular, which half round part is connected by a curved surface *g* with the bottom side of part *e* and by a tangential surface *h* with the top side of part *e*. The journal bearing *e*, whose base is in approximately a horizontal line, has its rear surface prolonged in an easy curve by the eccentric surface *g*, departing gradually farther from the center of bearing *e* as it approaches the bottom side of the part *e*, to which it is joined.

Seated upon the top of lug D is a rigid lever E, which corresponds in width to that of lug D, comprises a long arm *i*, a short arm *m*, and a fulcrum part *o*. When the lever E is in its normal position on the lug, its short arm *m* bears upon the top surface of part *e*, its fulcrum part *o* conforms to and bears on the semicircular part *e*, and the long arm *i*, clearing the eccentric *g*, extends down in an approximately vertical position to the path of the picker F, which it is faced to conform to, as shown in Figs. 7 and 8.

The short arm of lever E is provided with a slot *d'*, with an open mouth to the rear, as shown more particularly in Fig. 5, which slot, when the lever is in

its normal position, is a prolongation of slot *d* of the lug D, and above the rear end of slot *d'* in the short arm *m* and transversely thereto is a curved socket *s*.

Combined with lug D and lever E, to normally hold the lever in the relative position shown more particularly in Fig. 1, is a spring bolt bearing the short arm *m* to a bearing on part *c* of lug D and fulcrum part *o* to the part *c*. The spring bolt comprises a bolt *t*, adapted to be received in slots *d* and *d'*, and a rounded head *u*, adapted to straddle the short arm *m* above the slot *d'* and rest in the socket *s*, to which it conforms and in which it slightly rotates when the short arm *m* is separated from its bearing on the lug D, as shown in Fig. 2. A spring H surrounds the bolt and bears between the washer *w* and an adjusting nut *v* upon the threaded free end of the bolt *t* to regulate the strength of the spring. A washer *w* bears over slot *d* and receives the thrust of one end of the spring. An outside check nut *y* is also combined with the bolt, as shown.

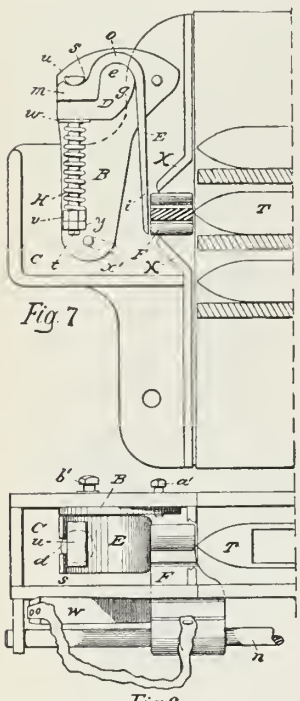


Fig. 7



Fig. 8

The bolt hole *a* in frame B is in the top of the frame, near the face of long arm *i* of the lever E, and, as shown in Fig. 7, serves to permit the frame to be bolted to the wall of the lay box, while bolt hole *b* is at the bottom of frame B and coincides with a curved slot *x'* in the wall of the lay box. Said slot is described on a circle, having the bolt hole *a* as its center, and by loosening the two bolts in said holes the bottom of the frame B can be swung to bring the face of lever E to different angles to compensate for the reduction in size and change in shape of the picker from wear, and in its changed position the frame B can be secured by simply tightening up the two bolts which bind it to the lay box wall.

In Fig. 7 portions of a lay box and shuttle box are shown, with the inner walls removed and the picker in partial section between the eveners X before being impelled by the blow of the shuttle T to swing lever E from its normal resting position. In the same position the lever is shown in top plan view in Fig. 8, with the picker F upon its guide rod *n* and tied to the picker staff W.

In operation the blow of the picker upon first impact starts the lever to rotate upon its half round fulcrum. After the commencement of rotation the long arm of the lever begins to find a fulcrum on the eccentric surface joined to its first journal bearing, and as the lever continues to swing under pressure its fulcrum continually shifts farther and farther from the short arm, and conversely nearer to the free end of the long arm, with the result that the lever gets weaker progressively and the weight, in the shape of the spring, gets stronger out of all proportion, due to the compression of the spring. By these means the blow of the picker and shuttle is opposed, a check yielding easily enough at first to prevent the rebound of the shuttle and rapidly increasing its resistance to absorb gradually all of the momentum of the shuttle before the limit of elasticity or setting of a spring weak enough for the initial resistance is reached, and while consequently there is always an elastic reserve to prevent a "smash."

The lever and spring bolt cannot by any operation of the shuttle or picker nor by the movement of the lay be detached from their frame and its lug; but when it is desired to remove the picker to replace it, or for any other reason, or when it is desired to tighten up the spring H, the bolt with spring can easily be withdrawn from slots *d* and *d'* and the lever E be lifted off its seat on the lug to leave an open space for removing the picker from the lay box, and to assemble the parts in operative position it is only necessary to drop the lever into its place and insert the bolt in the slots in the rear of the lug and lever.

It is evident that in place of slots *d d'* opening to the rear, a hole of larger diameter than the bolt through the seat of the lug and short arm of the lever to permit the bolt to be passed through and then through the coil spring before having the end nut screwed on the bolt would make the spring bolt equally effective; but the open end slots and socket *s* permit the withdrawal or assembling of the spring bolt with all of its parts as one piece and with the spring at an adjusted tension, so that to remove all of the downward extending parts of the device it is sufficient to pull the spring bolt from its place. When the short arm of the lever is separated from its seat on the lug as shown in Fig. 2, the socket *s*, by means of the bolt head resting on it, prevents the bolt from sliding out of the slots *d d'*. After the shuttle is checked this device becomes operative to return the picker and shuttle to the position to receive the blow of the picker staff automatically. *(Robert W. Andrews, Staffordville, Conn.)*

## ADJUSTABLE PICKER STAFF CHECK.

This picker staff check for looms has for its object to provide an adjustable device of this character adapted for use in connection with the picker staff or lever of the loom, to provide simple and efficient means for checking and holding the picker staff to prevent the tendency of the shuttle to rebound and break the threads.

Fig. 1 is a perspective view of a portion of a loom equipped with the new check attachment. Fig. 2 is a bottom plan view of the end portion of the lay beam carrying the check attachment. Fig. 3 is a transverse sectional view on the line 3-3, of Fig. 2.

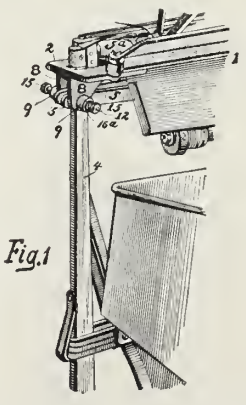


Fig. 1

1 designates part of a loom, 2 is the lay beam, provided at its end with the longitudinal disposed slot 3, in which plays the upper end portion of the picker staff or lever 4, driving the shuttle $5^a$ back and forth along the race of the lay beam.

Ordinarily provision is made for checking the outward movement of the picker staff 4, to prevent rebounding thereof and a consequent rebounding of the shuttle, so that when it (the shuttle) is struck the

next time it does not get the full force of the blow, and the result is a broken thread. To provide for this necessary checking of the picker staff, a pair of duplicate flat spring check plates 5 are used, arranged at one end of the lay beam 2, below said beam, and secured fast at their inner ends, as at 6, to opposite sides of a depending attaching block 7, secured to the under side of the lay beam in line with the longitudinally disposed slot 3 for the picker staff.

These flat spring check plates 5 are of sufficient length to permit of the requisite play for the picker staff and are disposed oppositely to each other in the same horizontal plane, so as to be arranged, respectively, at opposite sides of the picker staff 4, which is designed to play between said plates and to become frictionally gripped thereby at the outer limit of its movement.

The opposing flat faces of the check plates 5 are disposed in vertical planes, so as to flatly contact with the opposite sides of the picker staff, and the outer movable ends of the plates 5 are normally disposed closer together than the thickness or width of the

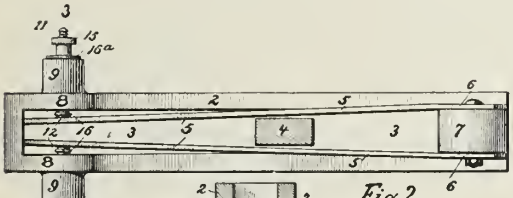


Fig. 2

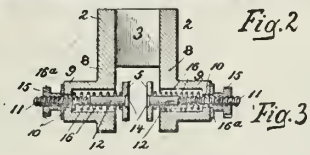


Fig. 3

picker staff 4, so that said picker staff on its outward movement must necessarily force its way in between the said outer movable ends of the check plates.

The outer movable ends of the check plates 5, are located immediately below the adjacent outer end of the lay beam 2, between a pair of parallel pendent beam ears 8, projected from the under side of the lay beam at the end thereof and located, respectively, at opposite sides of the slot 3, in which the picker staff works. The pendent beam ears 8, are provided on their outer sides with the offstanding socket projections 9, open at their inner ends and having in their outer closed ends the bolt openings 10, loosely receiving therein the outer threaded portions 11 of the adjusting bolts 12, the inner head ends 14 of which are fixedly fitted in the movable end portions of the oppositely located spring check plates 5, which check plates are made of steel spring, so as to have the requisite resiliency. The threaded portions of the adjusting bolts 12 extend through the bolt openings 10 of the socket projections 9, and receive thereon the adjusting nuts 15, working against washers 16a, arranged on the outer ends of the said socket projections 9.

Coiled cushion springs 16 are arranged inside of the socket projections 9 and encircle the bolts 12, with their ends respectively bearing against the outer sides of the plates 5 and the outer closed ends of the socket projections 9. The springs 16 normally hold the movable ends of the plates 5, as close together as required, while at the same time cushioning the outward movement of the said movable ends of the check plates, so as to retain the said plates in firm frictional contact with the opposite sides of the picker staff 4 when forced therebetween. By manipulating the nuts 15 the normal distance between the movable ends of the plates 5 may be varied to suit the sides of the picker staff 4 as the same become worn by use.

In operation the picker staff 4, plays between the spring plates 5 and on its upward movement is forced between and frictionally held by the movable end of the check plates until the next blow drives it back.

It will be observed that the construction insures the check plates exerting a gradual tightening pressure of the picker staff, so as not to materially interfere with its movement, while at the same time preventing any rebound and permitting of the easy release of the staff or lever. *(Daniel H. Wright, Lansingburg, N. Y.)*

## THACKERAY'S PICKER CHECK.

The object of this picker check is to control the throwing and the arresting of the shuttle more perfectly and thus permit increase of the speed of the loom.

Fig. 1 is a transverse sectional view of so much of a loom as is required to illustrate this picker check. Fig. 2 is an enlarged side view of the foot support of the picker stick and the lever coöperating with the rocker of the picker stick. Fig. 3 is a sectional view, on an enlarged scale, compared to Fig. 1, of the lay, showing the arm connected with the protector rod and bearing on the swell.

4 indicates the end frames of the loom; 5 the rock shaft, from which the arms 6 extend, which support the lay 7; 8 are the shuttle boxes; 9 the swells; 10 the protector rod; 11 the arms secured to the protector rod and bearing on the swells 9; 12 two hooked levers projecting from the rear of the protector rod, to which the wires or straps 13 are secured. The lower ends of these wires or straps are secured to the upper ends of the coiled springs 14.

To the ends of the rock shaft 5 the picker stick shoes 15, provided with the horns 16 are secured. The picker stick rocker 17 rests on and rocks on the shoe 15. The picker stick rocker is provided with the loop 18, the shanks 19 of which bear against the

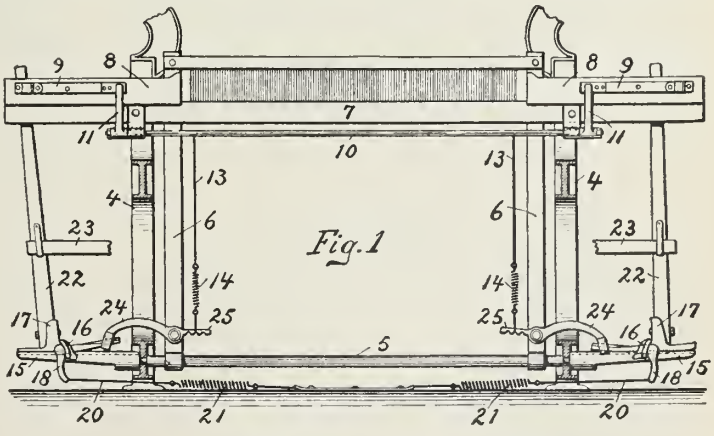


Fig. 1

horns 16. The loop 18 is connected by the wire strap 20 with the floor spring 21. The picker stick 22 is secured to the picker stick rocker and is operated by the picker mechanism (not shown) through the lug strap 23.

On the arms 6 of the lay, are pivotally supported

the levers, the short arms 25 of which are provided with notches, and a wire loop 26 connects this arm with the coiled spring 14. The bifurcated end 24′ of the lever 24 straddles the end 17′ of the picker stick rocker 17.

Fig. 1 illustrates the parts in the position they occupy when the shuttle is in the left hand shuttle box 8, when the greatest strain is exerted on the coiled spring 14 and the least strain on the floor spring 21

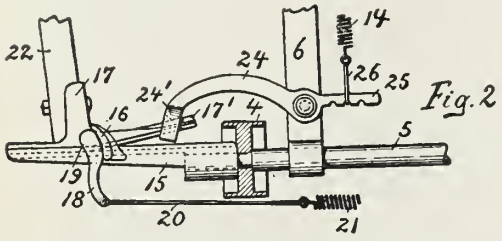


Fig. 2

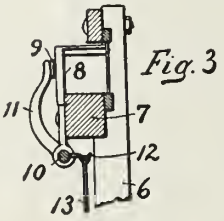


Fig. 3

on the left hand side of the loom. The strain thus exerted on the coiled spring 14 acts through the protecter rod on the swell to bind the shuttle and through the lever 24 on the end of the picker stick rocker. On the right hand side of Fig. 1 the strains on the coiled spring 14 and the floor spring 21 are practically balanced. The pressure on the swell 9 of that side is the minimum pressure.

When the shuttle in the left hand shuttle box is moved by the picker stick, the toe end 17′ of the rocker descends, the bifurcated end of the lever 24 follows the toe, and the short end 25 of the lever rises and diminishes the tension on the spring 14, thereby diminishing the strain on the protector rod and the pressure on the swell 9. As the shuttle proceeds the frictional resistance decreases until the final blow is given to send the shuttle across the shed. As the shuttle enters the shuttle box on the right hand side of the loom the pressure on the swell is sufficient to retard the shuttle by the friction on the swell. When the shuttle strikes the picker stick and moves the upper end outward, the bifurcated end of the lever 24, is moved upward by the toe of the rocker 17, the tension on the spring 14 increases rapidly, and with it the pressure on the swell, while the momentum of the shuttle decreases until it is arrested. The shuttle at this point is firmly held by the swell. It is in contact with the picker stick and ready for the next throw.

By thus controlling the picker stick and shuttle and maintaining the contact between the same the speed of the loom may be increased. *(Richard Thackeray, Fall River, Mass.)*

## BEGINS PICKER STICK.

In this stick the lug strap is secured to the stick without necessitating the boring of holes in the latter and thereby weakening it.

Fig. 1 is a side elevation of a portion of this picker stick, showing the lug strap attached thereto by means of its stirrup strap. Fig. 2 is an end view thereof. Fig. 3 is a central longitudinal section.

1 indicates the picker stick, provided upon one edge with a series of shoulders 2, against which a compression plate 3 abuts. This compression plate is mounted within an elongated rectangular yoke 4, the side pieces 5 of which are received by recesses 6 in the end of the compression plate, and the yoke is in turn provided with a tooth 7 upon the inner face of its bottom piece 8, designed to bite into the edge of the picker stick opposite the shoulders 2. The lug strap 9 is passed into the loop of the stirrup strap (as shown in Fig. 1), the ends of which are passed between the compression plate and the upper end of the yoke and are firmly clamped in place by a set screw 10, screwed through the top plate of the yoke and designed to pass through an aperture 11 in one end of the stirrup strap and to bear down upon the lower end, to perform the double function of holding the stirrup strap in place and clamping the compression plate against the stick with sufficient force to cause the tooth carried upon the bottom of the yoke to bite the opposite side of the stick, and thereby prevent displacement of the parts. Ordinarily the yoke is maintained in inclined position in order to better withstand the lateral strain exerted by the pull upon the stirrup strap incident to the tightening of the lug strap. It will be seen that by this means the stirrup strap is firmly retained upon the picker stick without the necessity for puncturing the latter and it can be readily adjusted to the desired position upon the stick by loosening the set screw and causing the yoke to be moved to bring the edge

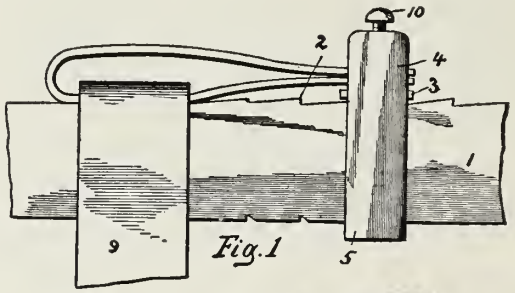


Fig. 1

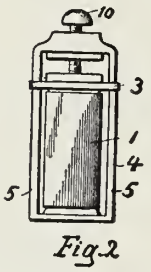


Fig. 2

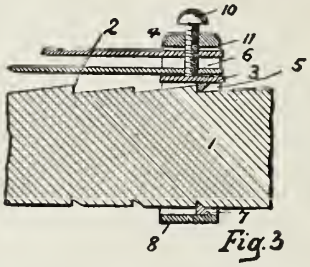


Fig. 3

of the compression plate against the desired shoulder, when, the set screw is caused to clamp the parts securely in the adjusted position. *(Joseph Begins, Lisbon Center, Me.)*

## A METALLIC PICKER STICK.

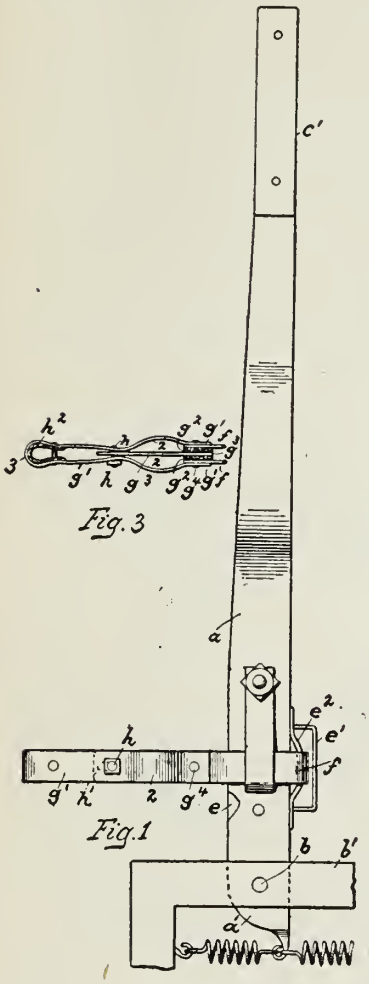
This stick is designed to take the place of the wooden sticks.

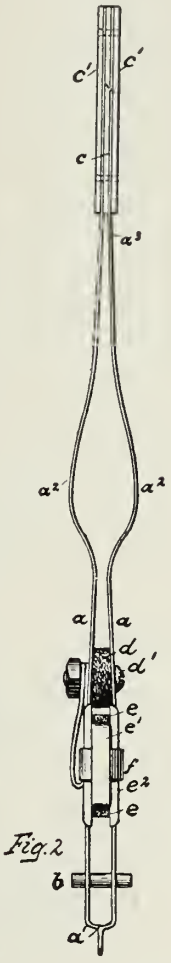
Fig. 1 is a side elevation and Fig. 2 an edge view of this picker stick. Fig. 3 is a top view of the lug strap.

The stick is composed of two thin sheet metal arms $a$, of spring steel, connected at their lower ends, as at $a^1$, below the fulcrum $b$ as mounted on extension $b^1$, connected to and moving with the lay.

The arms $a$ are extended upwardly above the fulcrum $b$ and are bent outwardly, as at $a^2$, and above that point they are brought again nearer together, as at $a^3$, the upper portion of the arms bearing the non-metallic material $c$, which may be rawhide, leather, wood or other suitable material, which meets the

usual metallic point or cone of the shuttle, said blades when extended into the usual slot of the lay being provided externally with non-metallic wear plates $c^1$,




which stiffen the picker stick at or in line with that part of it which contacts with the shuttle.

The bulge part $a^2$ of the arms constitutes a yielding section of such character that when the shuttle is struck to throw it from its box at one end of the lay the blow delivered will be a spring or yielding blow, it yielding sufficiently to avoid shocks, but the picker stick does not appreciably stop, for it follows sharply by its own movement the blow and impels the shuttle across the lay into the other box, where, meeting a like picker stick, the slight yielding of the picker stick again insures the checking of the shuttle in a yielding manner.

The part $c$, which directly meets the conical point of the shuttle, is broad enough to act on said point and impel the shuttle without the parts $a^3$ of the arms $a$, touching the said point; but as the shuttle point wears a hole into the part $c$ said hole may by such wear become so deep that the sides of the point may finally meet some part of the sides of the arms at $a^3$.

The arms $a$ are held pinched together below the bulged parts $a^2$ against a leather or other yielding washer $d$, by a bolt $d'$, and below this washer said arms are separated by a block of wood $e$, into which is entered the legs of a staple or loop $e'$, said loop having inclosed inside of it a spring bridge $e^2$, the ends of which are forked to embrace the ends of the loop, the loop retaining the spring bridge in place.

In the space between the said spring bridge and the loop is passed a short leather strap $f$, the free ends of which (see Fig. 3) are placed between the free ends of a metallic loop $g'$, it, with the strap $f$, constituting the lug strap; said figure also showing two leather washers $g^2$, placed between the ends of the strap $f$, the latter lying between the ends of the loop $g'$, the said washers having between them a metallic link $g^3$, the loop $g'$, strap $f$, washers, and link being securely held together by bolt $g^4$.

The part $g'$ of the lug strap is bent at 2 (see Fig. 3) to constitute a yielding portion, so that said lug strap may be extended somewhat in the direction of its length on the occasion of any excessive strains, the degree of such strains being limited by the link $g^3$, which is slotted at one end, as at $h'$, to embrace a bolt $h$, inserted through the side walls of the loop $g'$, the opposite end of said link being held by bolt $g^4$.

The bent part or eye 3 of the loop $g'$ receives in it a leather or other strap $h^2$, against which acts the arm operated by the loom to intermittingly move the picker stick and throw the shuttle. The lower end of the picker stick is connected, as shown in Fig. 1, to springs for keeping it in normal position. *(Joseph F. Benoit, George B. Goodall and Herbert J. Hope, Sanford, Me.)*

## WARDWELL'S PICKERS.

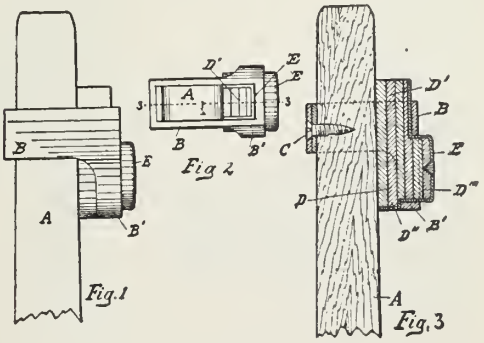
These pickers are improvements over the one described on page 95 of "Textile Machinery Part I."

Fig. 1 is a side elevation of one of these pickers, shown attached to its picker stick. Fig. 2 represents a top plan view of Fig. 1. Fig. 3 represents a longitudinal section on the line 3-3, shown in Fig. 2.

A represents the loom picker stick, which receives the metal loop B, secured to picker stick A by means of screw C.

In one piece with the loop B, is made the ring B', for holding the filling D made of leather or other material and of cylindrical or oval shape so as to fit the correspondingly shaped ring B' and provided with an upwardly projecting shank D', adapted to fit the interior of the front portion of the binder B.

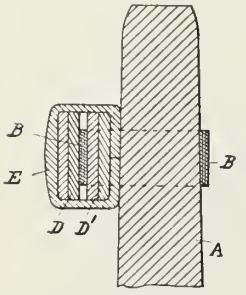
For preventing the filling D from coming to pieces, breaking apart, or working out of the ring B' by successive blows against the point of the shuttle and to hold its parts together and locked within the ring B', as well as to increase its wearing capacity, said filling is enclosed within a raw hide covering E.




The lower portion of the filling D is provided with a downwardly extending projection D", adapted to be held in place against the picker stick by means of the lower portion of the ring B', and by such arrange-

ment the filling is caused to be firmly held in place relative to the picker stick A and the loop B. The filling D is provided with a projection D''', extending outwardly beyond the ring B', so as to prevent the point of the shuttle to come in contact with the metal loop B or ring B'.

Another construction of such a picker for single box cotton looms is herewith shown. This picker is lighter, since the metal loop and ring as used in the construction of the previously described picker are dispensed with.




The illustration represents a longitudinal section of this make of picker.

A indicates the picker stick, B the loop made from a textile or fibrous ribbon that is laminated and has its overlapping layers secured together by means of adhesive material, which, when set and hardened, retains said loop in its proper form.

D and D' represent the filling part of the picker, being leather or other suitable yielding material.

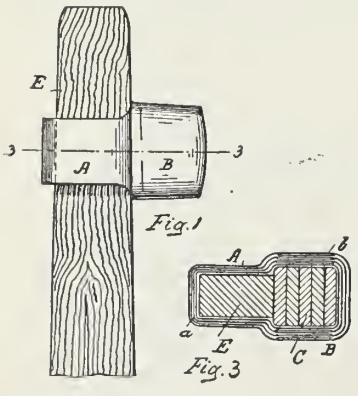
E is the casing, made from a single piece of raw hide which while in a moist or soaked condition, is moulded and compressed around the forward portion of the loop B and part of the filling (D') contained therein, and while drying, is caused to contract, thus firmly uniting loop B to the picker proper (casing E and filling D, D').

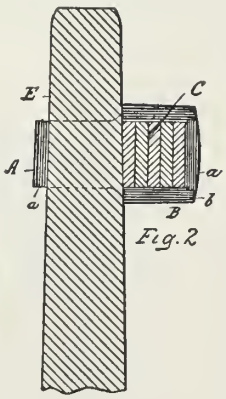
The picker is secured to the picker stick by means of a screw fastened through the loop B to the rear side of the picker stick.

Another construction of such a picker for single box cotton looms is herewith shown, the difference between it and the previously described picker consisting in the manner of forming a casing for the filling and its relation to the loop; the material which forms the loop at the same time being used in part for producing the casing.

Fig. 1 represents this picker in its side elevation shown attached to the picker stick, Fig. 2 represents a longitudinal section of the same and Fig. 3 represents a cross section on the line 3-3, Fig. 1.

A represents the loop, B the casing and C the




filling. The loop A is composed of a fibrous strip *a*, and the casing B is likewise composed of a fibrous strip *b*.

In making this picker, a picker stick dummy or "former" of metal and of a sectional shape like the picker stick E, is employed. Against the front edge of this "former" is placed the filling C, and around the later and the "former" is wound in a horizontal plane, the strip *a*, saturated with cement, and which strip serves for the formation of the loop and also in part as the formation of the casing within which the filling is contained. At the same time there is wound around the filling in a vertical plane a similar strip *b*, likewise saturated with cement, and which strip also serves for the formation of the casing within which the filling is contained. In winding the said strips *a* and *b* around the filling C, one of the strips is alternately lapped over the other where they cross each other, so as to cause the laminated layers of the respective strips to be firmly united together by the adhesive material.

After the cemented strips have been thus wound around the "former" and filling C their ends are cemented onto the respective outer layers and thus are secured in place, after which the casing is forced into a female mold of the shape and size intended to be given to the finished casing and allowed to set and harden, after which it is removed from said mold and the dummy picker stick or "former" withdrawn from the loop A, leaving the now finished picker in shape adapted to receive the picker stick E, and to which it is secured (at its rear side) by means of a screw fastened through loop A. *(Frank A. Wardwell, Methuen, Mass.)*

## PICKER ROD CLAMP FOR PLAIN LOOMS.

The object is to provide a clamp by which the picker rod is held in place without exposing or subjecting it to the friction and wear due to bringing the clamping screw in direct engagement with the picker rod.

Fig. 1 is a perspective view of part of a lay and a picker rod with the clamp applied thereto. Fig. 2 is an enlarged detail perspective view of the clamp by which the picker rod is attached to and held tightly on the lay. Fig. 3 is a vertical longitudinal sectional view through the clamp.

1 designates a portion of the lay, 2 the picker rod, and 3 the clamp, consisting of the two members 4, 5, an eye formed bolt 6, provided on one side of the fixed member 4, and an attaching bolt 7, projecting from the other side or face of the member 4 of said clamp. The members 4 and 5 constitute the jaws of the clamp by which the picker rod is held securely in place within the clamp, and the bolt 7 provides the means for attaching the clamp itself rigidly to the lay 1. The inner working face of the fixed member 4 of the clamp is flat, except at the central portion thereof, where it is provided with a curved groove or channel 8. The bolt 6 is straight for a part of its length, but the inner part of the bolt 6 is formed with a bifurcated part which joins with the fixed member 4 of the clamp, said forked part of the bolt 6 being coincident with the groove or channel 8 to form therewith an eye or passage for the reception of one end of the picker rod 2.

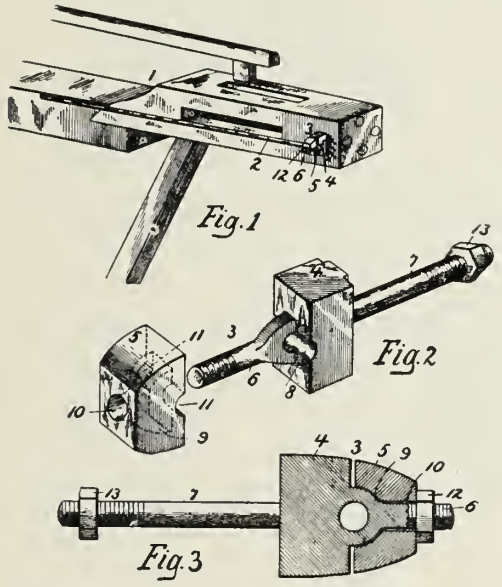
The movable member 5 of the clamp is formed with a recess 9, which terminates in an aperture 10, and the inner edge or face of said movable member has grooves 11 intersected by the recess 9.

This construction of the member 5 enables it to be fitted on the bolt 6, so as to receive within its recess 9 the forked part of the bolt and to have the straight shank of the bolt 6 pass through the aperture 10, whereby a nut 12 can be screwed on the protruding end of the bolt 6 to force the movable member 5

tightly upon the picker rod and thus clamp the picker rod between the two members 4 and 5 of the clamp.

The clamp is applied by passing the attaching bolt 7 through an opening in the lay 1 and adjusting the nut 13 to fasten the bolt 7 and the clamp securely in place on the lay. The end of the picker rod is passed through the eye formed by the fixed member 4 and the forked end of the bolt 6, and the movable member 5 is now applied to the bolt 6 and the nut 12 screwed in place to force the movable member toward the fixed member. The recessed or grooved faces of the members receive the picker rod, and said faces of the members serve to bind the picker rod tightly in position between them and hold the same securely in place. These members 4 and 5 provide broad bearing surfaces to grip the picker rod to avoid cutting or wearing into the same and to grip the picker rod securely to sustain it in position.

The movable member 5 embraces the forked part of the bolt 6, and is held thereby against rotation on the bolt 6; the two members 4 and 5 being adjusted



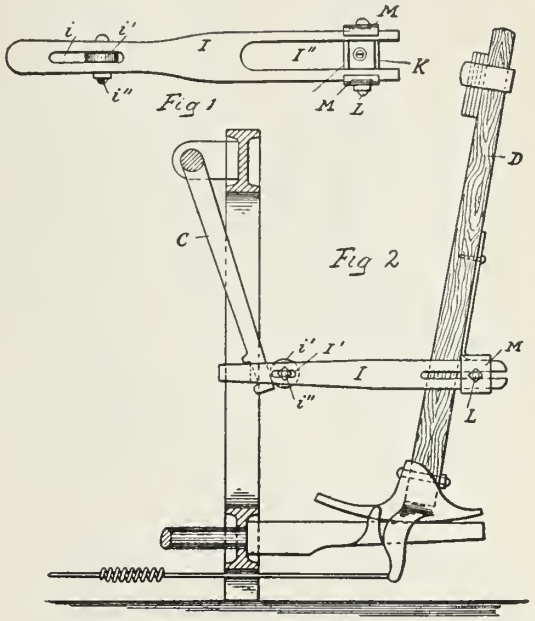

so that they do not abut against each other, but leave a space between them, to enable them to act efficiently in gripping the picker rod. *(Wm. J. Thompson, Haw River, N. C.)*

## JACQUES & PAINCHAUD'S LUG STICK.

The device has for its object the making of a more rigid connection between the picker shaft arm and the picker stick by means of an integral lug stick, doing away with the lug strap.

Fig. 1 is a top plan view of this lug stick. Fig. 2 is a side elevation of it, shown applied to the picking mechanism of a loom.

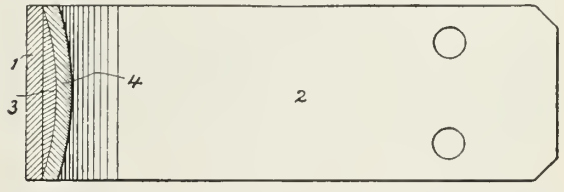
I is the lug stick, having a vertical slot *i*, adapted to receive the lower end of the picker shaft arm C. In the slot *i*, is arranged a disk *i'* journaled on a bolt *i''* which is adjustable in slot I' so as to hold the said disk *i'* in contact with the picker shaft arm C. The picker stick D is made to pass loosely through the forked recess I''. In the outer end of the lug stick I is adjustably secured a block K by means of a bolt L. In connection with the adjustable block K, flanged plates or washers M are used, which embrace the




upper and lower edges of the slotted ends and prevent them from spreading. *(Leopold Jacques and Ludger Painchaud, Salem, Mass.)*

## HOUGHTON'S LUG STRAP.

The illustration is a longitudinal section of this strap, which has for its object to present more wearing surface to the picker stick, also to divide up the strain on the strap, by taking it off its edge. To accomplish this, the strap has a pyramidal shape leather filler block 3, placed between the two strips (between their flesh sides) of leather 1 and 2, at the bend where the strap comes in contact with the picker stick, thus giving the strap a curved or convex sur-



face bearing 4, calculated to resist the wear of the stick and in consequence prolonging the life of the strap. *(E. F. Houghton and Co., Phila.)*

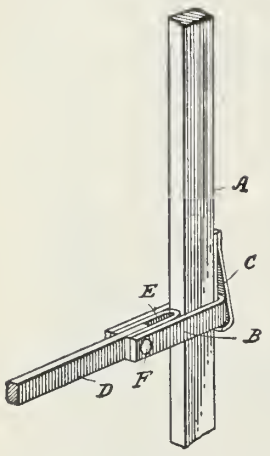
## BEARING STRAP FOR THE LUG STRAP.

The object of this bearing strap is to hold the lug strap always against the picker stick.

The illustration is a perspective view, showing a portion of the picker stick, the loop strap, lug strap, and the looped bearing strap.

A is the picker stick, B the lug strap, and C the stirrup or loop strap. Within the lug strap and at-

tached also to the pitman D, is arranged a looped bearing strap E, which bears against the inner face of the picker stick and holds it tight against the lug strap, thereby preventing the lug strap from working up and down, and causing breakage. This bearing strap E also prevents any sudden jerks upon the picker stick. One end of it is sewed to one end of the lug strap while the other end is slotted longitudinally, so as to render said strap adjustable to different sizes of picker sticks. The same bolt F which secures the lug strap also secures this bearing strap E.




*(Joseph Begins, Lisbon Center, Me.)*

## PICKER STICK ATTACHMENT.

The object of the device is to provide a picker stick attachment forming a fulcrum for the stick and a fastening for the return strap, the attachment permitting of convenient insertion and adjustment of the picker stick without weakening the stick by holes, thus lengthening the life of a picker stick.

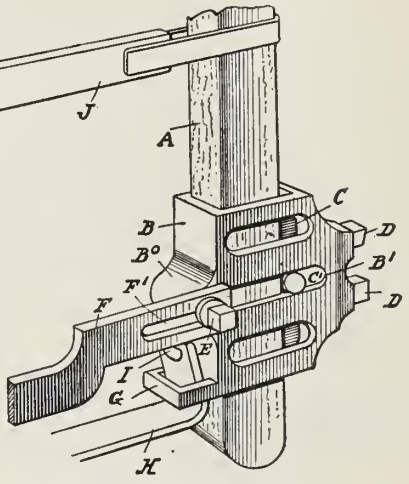
The illustration shows a perspective view of the attachment.

A indicates the picker stick, the lower end of which is adapted to pass into a casing B, open at the top and bottom, the inner end of the picker stick resting against the inner side of the casing and the outer edge being engaged by a clamping plate C, adapted to be forced against the stick by set screws D, screwing in the outer side of the casing B. The clamping plate C is provided with laterally extending trunnions C', fitting loosely in horizontally extending guide ways B', formed in the front and rear of the casing B, so as to hold the plate C from falling out of the casing and at the same time permit longitudinal movement of the plate to engage the same with the picker stick when screwing up the set screws D.

The inner face of the clamping plate C and the inner surface of the inner side of the casing B, have projections, adapted to embed themselves in the wood of the picker stick to securely hold the same in place when the clamping plate C is moved up against the stick by the set screws.

On the inner side of the casing B is formed an apertured lug B° engaged by a bolt E, held adjustable in the elongated slot F' of the rocker arm F, so that the casing B and the picker stick A are swung on the said bolt E as the fulcrum.

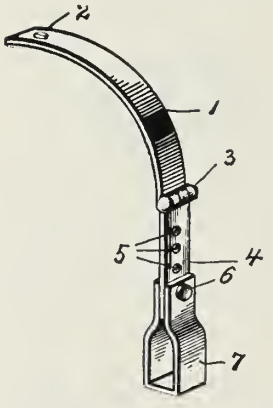
On the lower edge of the casing B and at the inside thereof is formed integrally a loop G, through which passes a return strap H, hooked upon a hook I, formed integrally on the inner side of the casing B directly above the loop G. The other or inner end of the return strap H is attached to the frame of the




loom. J is the sweep stick connected to picker stick A above the casing B. *(F. M. and W. W. Hutchison and A. B. Hudspeth, Mayfield, Ky.)*

## DURHAM'S STIRRUP FOR PICKER STICKS.

The same is shown in its perspective view in the illustration, and consists of three parts connected together. 1 is the curved portion, which by means of hole 2 is fastened by a bolt to a disk on the picker stick. This curved portion is by means of hinge connection 3 connected to the straight portion 4, which in turn, is adjustable by holes 5, connected through a bolt 6 to the stirrup 7, which is fitted to the picking lever of the loom. The yielding movement of this stirrup is accomplished through hinge connection 3, connecting the curved portion 1 and straight portion 4.




*(Robert L. Durham, Burlington, N. C.)*

# SHUTTLES.

## SERGESON'S THREAD TENSION DEVICE.

Fig. 1 represents a top view of a portion of a shuttle showing this tension device, Fig. 2 a side elevation of the shuttle, Fig. 3 a section on line *x-x*, Fig. 1, Fig. 4 a section on line *y-y*, Fig. 1, Fig. 5 a section on line *z-z*, Fig. 1, and Fig. 6 another top view of the tension device.

A designates the body of the shuttle, B a passage in the body, near the front nose thereof, the same being adapted for the passage of the filling. Adjacent to said passage B is a sleeve C, which is parallel therewith and has a throat D in the side thereof, the same communicating with said passage B. The base of said sleeve is open and communicates with the eye E through which the thread is discharged, said eye extending transversely to said sleeve, both eye and sleeve occupying openings in the body A, it being noticed that the passage B, the throat D, and eye E are in communication, so that the thread may be run therethrough. The opening in which the eye E is located communicates with the opening in which the sleeve C is located below the latter, which is seated on a shouldered portion of the walls of said sleeve opening, so as to be flush with the wall of the lower portion thereof. In order to hold the sleeve in position, the screw F is employed and which screw enters the body A and has its head adapted to rest upon and tighten against the adjacent edge of the sleeve, it being noticed that said edge is cut away, as at G, so that the head of the screw may be below or within the surface of the body A.

H designates a pin which is driven into the body A and has a portion exposed and in contact with the edge of the wall of the passage B at the side toward the eye E, forming a bushing, so that the thread in its movement through said passage runs on said pin, which, being of metal or other hard material, is more durable than the adjacent portion of the body,

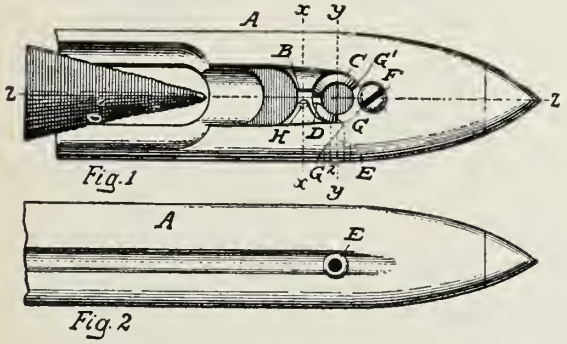


Fig. 1

Fig. 2

which is wood, thus preventing the thread from cutting the wall of said passage B.

The top wall of the sleeve is inclined or spiral in downward direction from the shoulder G' to the throat or opening D, so as to direct the thread or yarn to said throat when primarily contacting with said wall and drawn outwardly in threading the shuttle through said sleeve and the eye E, it being noticed that the inlet end of said throat is considerably below the upper face of the body of the shuttle.

It will be seen that when the screw F is loosened the sleeve C may be turned so as to place the throat in register with the passage B to allow the thread to run freely through the latter, or, by further rotation of the sleeve, the throat may be removed from said passage so as to deflect the thread and cause a corresponding friction of the same with the wall of the latter, as seen in Fig. 6, the tension on the thread thus being increased, the extent of the tension being adjusted by the degree of rotation of the sleeve. When the adjustment is accomplished, the screw is

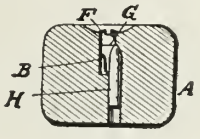


Fig. 3

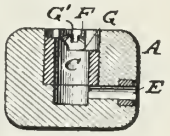


Fig. 4

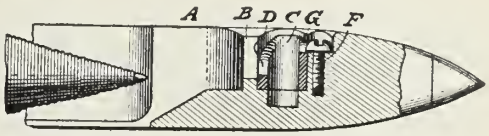


Fig. 5

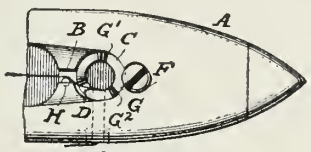


Fig. 6

rotated, so as to have its head press against the sleeve, thus holding and controlling the latter.

The cut away portion G of the sleeve C forms shoulders G' G² on the top of said sleeve, the shoulder G', owing to its adaptability to be engaged by the head of the screw F, preventing improper rotation in backward direction of the sleeve C, while the shoulder G², limits the forward rotation of said sleeve to an extent beyond which the throat D is no longer serviceable. The upper and inner portions of the wall of the opening D in the sleeve C are rounded so as not to present any sharp edges to the thread in its passage through said opening. *(James C. Sergeson, Phila.)*

## MORIN'S SPRING FOR SHUTTLE SPINDLES.

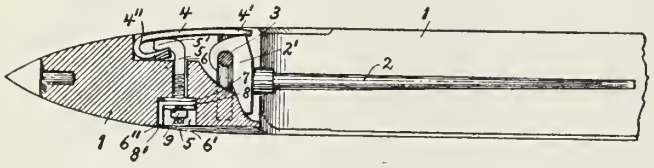
The illustration shows a central longitudinal section of a shuttle having this spindle spring attached.

1 indicates the shuttle body, 2 the spindle, the head 2' of which is pivotally attached in the body of the shuttle by a staple 3, the transverse portion of which extends into an open end slot in the spindle head.

The spindle spring 4 is of a peculiar shape, not reversible and much shorter than usual shuttle springs, therefore the slot for the spring in the shuttle body is shorter and does not extend as far toward the end of the shuttle.

The spring 4 has one end 4' secured in the shuttle body, bearing on the spindle head and holding the

spindle in its lowered or raised position. The other end 4″ of the spring 4 instead of being flat, as in other makes of shuttles, is bent back upon itself toward the other end to form an open hook, and is curved upwardly in cross section to form a depression or recess to receive the head or bent end 5′ of the attaching bolt 5, which extends at right angles to the plane of the spring through a transverse hole 6 in the shuttle body, which is enlarged at its outer end 6′ to receive a washer 7 on the attaching bolt 5, also a second washer or ring 8, having a lock pin 8′, which extends into a groove or recess 6″, leading out from the enlarged end 6′ of the opening 6, and prevents the turning of said washer or ring 8. A nut 9 is screwed onto the threaded end of the attaching bolt 5 and is provided with recesses in the circular part thereof to receive the pin 8′, which thus acts to lock the nut 9 on the bolt 5.




To regulate the tension of the spring 4, the nut 9 is turned on or off the bolt 5. *(D. T. Dudley and Son Co., Wilkinsonville, Mass.)*

## THE CROMPTON & KNOWLES SHUTTLE FOR MAGAZINE LOOMS.

Fig. 1 is a top or plan view of the shuttle, partially broken out to show its jaws for holding the filling carrier; and Fig. 2 is a side elevation with one wall of the shuttle broken out to show the rest.

A indicates the body of the shuttle, B the jaws as notched or grooved at their inner sides to receive the projections C on the head of the filling carrier D. E is the self threading contrivance.

The filling carrier when exhausted, is automatically discharged through the bottom of the shuttle by the action of an incoming full filling carrier against it, the said full filling carrier being put into the top of the shuttle while the latter is in the shuttle box by a pusher, and the projections of the incoming filling carrier ought to meet and enter the notches of the jaws B. If, however, the projections on the incoming filling carrier happen to be out of line somewhat with relation to the notches in the jaws, then the tip of the incoming filling carrier is apt to descend below the under side of the shuttle, so that when the shuttle is thrown in the direction of the arrow, the tip of the filling carrier will catch, thereby injuring the filling carrier and shuttle. The employment of the rest F obviates this completely, and in case the projections on the incoming filling carrier are not correctly placed with relation to the notches in the jaws, the spent filling carrier will be discharged base or head first, for the reason that the tip of the filling carrier will meet the rest F and the incoming filling carrier will also, under the conditions referred to, meet the rest F and the tip will be immediately arrested, so that the continued action of the pusher enables the incoming filling carrier to slide longitudinally, so that its projections enter properly the notches of the jaws B. *(Crompton and Knowles Loom Works.)*

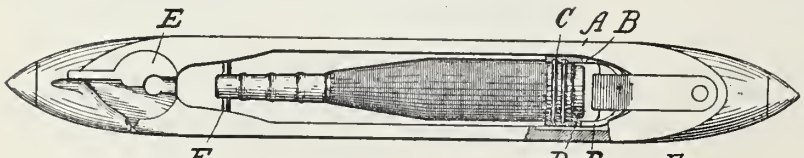


Fig. 1

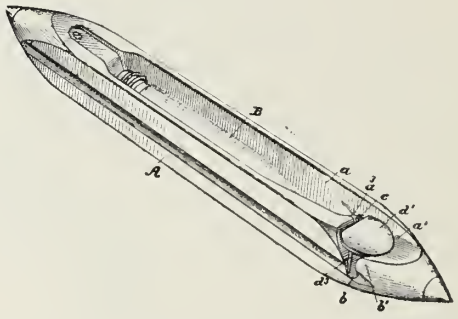
Fig. 2

## DRAPER'S SELF THREADING SHUTTLE.

The illustration shows a perspective view of this shuttle.

This shuttle has its body A longitudinally slotted from top to bottom at $a$ to receive filling carrier B, and at the delivery end of the shuttle a concavity $a'$ is made, communicating with a transverse slot $b$ in the side of the shuttle, forming the thread eye. Above the said eye the material of the shuttle body is rearwardly and downwardly inclined at $b'$ to more readily guide the filling thread to the eye in the act of threading.

The front wall of the slot or opening $a$ is partially cut way to leave a longitudinal wall $a^3$, forming one side of the thread receiving opening near the point of the filling carrier B. The opposite side of said opening is almost closed by a pin $c$ depending from the head $d'$ of a metallic stud nearly to the bottom of the thread receiving opening in front of and slightly to one side of the point of the filling carrier B.




A counter sunk hole is bored in the shuttle body at the bottom of the concavity $a'$ and at one side of the longitudinal center of the shuttle to receive an enlarged foot or base of the said stud, which latter is provided with a threaded hole to engage a retaining screw inserted through a hole in the shuttle body. The metallic stud previously referred to, acts as a post or pin around which the thread is led to the side eye $b$, being guided thereto by the mushroom or umbrella shaped top $d'$ of the stud, around the periphery of which the thread passes and between it and the concavity $a'$.

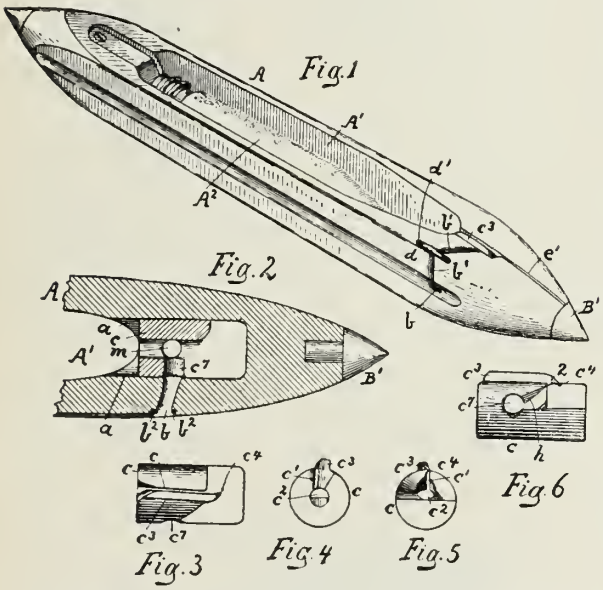
The head $d'$ is slabbed off so as to fit against the transverse wall, extending part way across the shut-

tle, and a steadying pin $d^3$, secured to the head, is adapted to enter a hole in the shuttle at the rear side of the side eye $b$, preventing turning of the metallic stud and also forming a metallic side for the eye $b$. The pin $c$, depends from the straight side of the head $d'$ and is curved inward toward the longitudinal center of the shuttle, so that it serves as a guide to direct the thread beneath it and into the space between it and the side $a^3$ as the thread unwinds from the point of the filling carrier.

After the thread has passed beneath it the pin $c$ acts to retain the thread in the receiving opening, whence it passes around the metallic stud and beneath its head $d'$. This position of the thread is brought about by the first throw of the shuttle, and on the return throw the mushroom like head $d'$, guides the thread between it and the inclined wall $b'$ into the side eye $b$, from which it is subsequently delivered. *(Draper Co.)*

## NORTHROP'S SELF THREADING SHUTTLE.

Fig. 1 is a perspective view of this shuttle, Fig. 2 an enlarged sectional detail thereof, Fig. 3 a top view




of the thread director removed, and Figs. 4, 5 and 6 other views thereof.

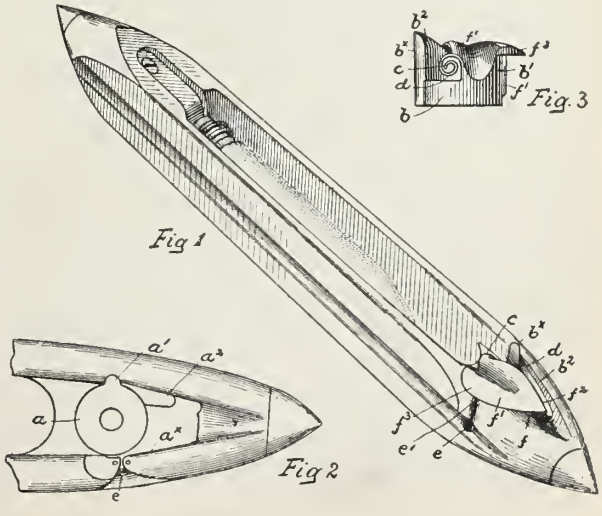
The shuttle body A has an opening A′ made therein from its upper through its lower side for the passage of the filling carrier $A^2$. The shuttle body A is provided with a chamber $a$, intersecting the opening A′, and the top side of the shuttle between said opening A′ and the tip B′ is provided with a longitudinal slot $c'$, intersecting and leading from said chamber, and the said chamber is intersected from the front of the shuttle with a hole $b$, and this hole is intersected from the top of the shuttle body with a slot $b'$. The hole $b$ constitutes the shuttle delivery eye, and to prevent wear of the wood, two metallic pins $b^2$ are set, as is shown in Fig. 2.

In the chamber $a$ is placed a thread director, being a metallic block $c$ (shown detached in Figs. 3 to 6) said block having a central opening $c^2$, intersected by a slot $c'$, and also having a rib $c^3$, prolonged to form a beak having a point $c^4$, which crosses the line of said slot and prevents the filling thread from escaping during weaving. This block is so placed in the said chamber that said beak, which is also inclined downwardly at 2, stands in and crosses somewhat the said slot $c'$, so that the filling thread drawn into slot $c'$ as the shuttle is thrown through the shed, the free end of the filling being held by the filling end holder of the loom, will strike the said point and be deflected to one side and will then pass below and under the inclined breast $h$ of the said beak and will enter the opening $c^2$. Once into the opening $c^2$ and the shuttle having been thrown back again into the shuttle box at which it received the new filling, the filling thread will enter automatically the slot $b'$, and the strain on the thread will cause it to pass under the end or point of an inclined finger $d$, the extremity of which rests in a pit $d'$, cut out of the top of the shuttle body, there being a clear space beveled downwardly under said finger $d$ and between it and the slot $b'$. The block $c$ has at one side a hole or eye $c^7$, into which enters the thread after passing down the under inclined edge of the point $c^4$. The filling thread will be automatically drawn in the movement of the shuttle into these slots in succession and will be laid into the delivery eye $b$ and issue therefrom into the shed. The block $c$, is held in the shuttle by a screw $m$, inserted from the under side of the shuttle and entering a threaded part of the block, the end of said screw being shown in Fig. 2. *(Draper Co.)*

## NORTHROP'S IMPROVED SELF THREADING SHUTTLE.

Fig. 1 is a perspective view of this shuttle. Fig. 2 is a top or plan view of the delivery end of the shuttle with the threading block removed. Fig. 3 is a rear end elevation of the threading block detached.

The fore part of the shuttle body is cut out or recessed at $a$, $a'$, $a^2$, Fig. 2, to receive and position the threading block, which comprises a partly cylindrical body $b$, having upturned walls $b'$ and $b^2$, the body being seated in the recess $a$ of the shuttle and retained in place by a screw (not shown). As shown in Fig. 3, the wall $b'$ has attached to or forming part of it a scroll $c$, in alignment with the filling carrier, into which the filling thread is led from the threading passage or slot $d$, formed by the wall $b^2$ and the exterior of the scroll $c$. The wall $b^2$ is farthest from the scroll $c$ at its rear end, gradually converging to the forward part of the threading passage $d$, making a flaring or divergent entrance thereto, which greatly assists the thread in being led into the said passage.

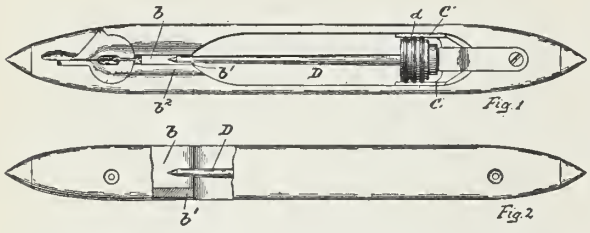


An upright enlargement $b^x$ on the wall $b^2$ enters the groove $a'$ in the shuttle body. The forward under part of the wall $b^2$ is cut away for the purpose of fitting in the recess $a^2$, while its upper edge inclines toward the point of the shuttle body.

The wall $b'$ is forwardly extended to form a horn $f$, the curved lower edge of which guides the thread from the threading passage $d$ to the slot or notch $e'$ of the delivery eye $e$, said horn $f$ having a laterally extended head or shelf $f'$, being bent to coincide with the slope of the top of the wall $b^2$ and overlapping it at $f^2$ across the threading passage $d$ in front of and above the scroll eye, to prevent the removal of the thread from the passage. At its opposite side the head or shelf of the horn extends at $f^3$ over the entrance of the delivery eye $e$, forming with the wall $a^x$ of the shuttle body a passageway for the thread to the eye. When the thread enters the flaring of the passage $d$, it must pass beneath the overlap $f^2$ to enter fully into the passage, and thence pass into the scroll eye $c$, the horn $f$ and part $f^3$ of the head guiding the thread to the delivery eye $e$. *(Draper Co.)*

## AUBÉ'S SELF THREADING SHUTTLE FOR NORTHROP LOOMS.

The object is to provide the shuttle with a support for the tip of the filling carrier when the latter is ejected, to thus always insure the discharge of the filling carrier head downward, a narrow guide way in




the shuttle body leading to the support to conduct and guide the tip of the incoming filling carrier, the walls of the guideway preventing lateral deviation of the tip of the filling carrier when the latter is being ejected from the shuttle. Under normal conditions the tip of the filling carrier does not contact with the support, but is held a short distance above it.

Fig. 1 is a top or plan view of the shuttle (self threading) with a filling carrier in place therein, the filling on the carrier being omitted. Fig. 2 is a side view thereof, partly broken out to show the tip support and the guideway leading thereto. The shuttle is open at its top and bottom, and at its forward end is formed a longitudinal narrow slot or recess $b$, open at its inner end and extending from the top of the shuttle toward its under side, forming a guideway with vertical side walls, leaving a support $b'$ at the bottom of the guideway in the plane of the longitudinal axis of the shuttle and at or near its under side. At its upper end or entrance, the guideway $b$ is made slightly flaring, as at $b^2$, to facilitate the entrance of the tip of the filling carrier D thereinto.

When a full filling carrier is inserted in the shuttle, its tip enters the narrow guideway $b$ and is thereby maintained in proper position to enable the head $d$ to accurately enter and be engaged by the jaws C. Should the projections on the head of the incoming filling carrier fail to register with the grooves in the jaws then the support $b'$ will engage the tip of the filling carrier and prevent it from descending below the under side of the shuttle.

When a spent filling carrier is about to be ejected from the shuttle, the tip is held by the support $b'$ so that the head will descend first and at the same time the adjacent side walls of the guideway $b$ act to position the tip and prevent its lateral deflection, so that the ejected filling carrier will pass properly and without catching through the discharge slot or opening in the bottom of the shuttle box. The support also serves to prevent the dropping of the tip of the filling carrier when the shuttle is in motion should the head become loosened in the holder. *(Draper Co.)*

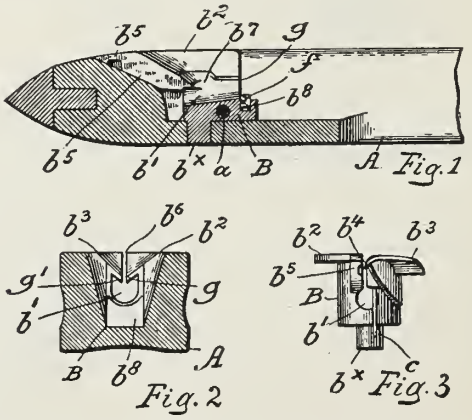
## STIMPSON'S SELF THREADING SHUTTLE FOR DRAPER LOOMS.

Fig. 1 is a longitudinal sectional view of part of the shuttle; Fig. 2 is a transverse section of it, and Fig. 3 is a front elevation thereof of the thread guide block detached.

A represents the shuttle body, having the front end cut out to receive a threaded guide block B, which is provided with a longitudinal passage $b^1$, through which the thread passes. The top of this block B is enlarged to form wings $b^2$, $b^3$, of which the wing $b^2$ has a forward extension $b^5$ projecting downward, forming one wall of the thread receiving passage. The wing $b^3$ has at its front end a spur $b^4$ to guide the thread along the threading passage $b^1$ to the eye, said spur being bent across the slit $b^6$, the part $b^5$ being recessed to receive it, so that the thread can pass over the spur into the slit, but being impossible for it to slip out.

The wings $b^2$, $b^3$, are inclined toward each other at the rear end of the slit $b^6$, which is enlarged by an inclined passage $b^7$, which intersects the large passage $b^1$, and back of said enlargement the wings have secured to them two oppositely inclined guards $g$, $g^1$, which overhang the rear end of the passage $b^1$ and form a slit which admits the entrance of the thread, but after it has entered the slit the guards keep it from flying out during weaving.

The block B has its rear end upturned, as at $b^8$, to form a seat in which is placed a piece of felt $f$, to constitute a tension device for the thread, and also has an upright pin $c$ at the front end of the passage




$b^1$, on the side toward the thread eye which forms a rounded surface and prevents wearing of the thread.

The bottom of the block B has a stud $b^x$ formed thereon to enter a hole in the shuttle body, and a retaining screw $a$, Fig. 1, passes transversely through the shuttle body and a hole in the thread guide block B, to securely hold the latter in place. *(Draper Co.)*

## IMPROVED BOBBIN HOLDER FOR SHUTTLES FOR NORTHROP LOOMS.

This holder is an improvement over the one described on page 97 of "Textile Machinery Part I," in which construction the jaws of the holder spread or yield laterally by virtue of their inherent resiliency, and the inclined directing plate for the filling carrier is formed of a separate piece of metal secured to the shuttle body.

In the present improved construction the jaws are controlled as to their movement by a separate spring,

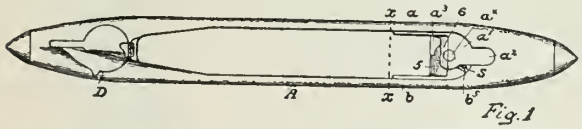


Fig. 1

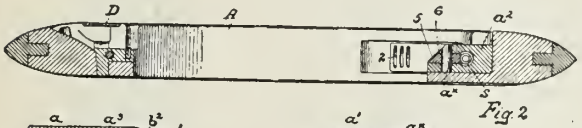


Fig. 2

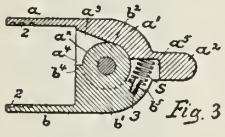


Fig. 3

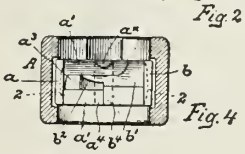


Fig. 4

and the directing incline for the filling carrier forms a part of the holder itself.

Fig. 1 shows in its top or plan view, a shuttle having the new holder applied thereto. Fig. 2 is a longitudinal sectional view thereof. Fig. 3, on a larger scale, (compared to Figs. 1 and 2,) is a horizontal sectional view of the holder for the bobbin; and Fig. 4 is an enlarged transverse sectional view on the line $x$-$x$, Fig. 1, looking toward the right.

A indicates the shuttle body and D the automatic threading device.

The holder for the filling carrier comprises two jaws $a$, $b$, one of which is enlarged at $a'$ and rearwardly extended to form a retaining projection $a^2$, adapted to be tightly fitted into a recess in the shuttle body. The body $a'$ is recessed in front at $a^3$, Figs. 1, 3 and 4, between the top and bottom thereof to receive the rounded hinge portion $b^2$ of the other jaw, mounted to swing laterally on a stud $a^x$ in the body $a'$. The jaw bases are shouldered at their inner sides, as at $a^4$, $b^4$, serving as stops to limit the inward movement of the jaws. Spring $s$, resting in a recess $a^5$ of the body $a'$, bears at its free end on the shoulder $b^5$ of the enlarged portion $b'$ of the jaw $b$ back of its fulcrum $a^x$, pin 3 preventing accidental displacement of the spring.

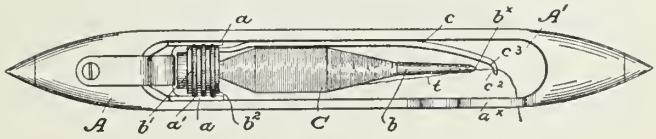
On their upper faces the two body portions are cut concentric to the fulcrum, so that the jaw $b$ may be swung laterally relatively to the jaw $a$, the latter being rigidly held in the shuttle body. Between the inner faces of the jaws the holder is inclined or beveled at 5, 6, Figs. 1 and 2, to form a directing surface for the filling carrier, when it is inserted in the shuttle, the jaws having grooves 2 therein to receive and hold the usual projections or ribs on the base of the filling carrier. *(Draper Co.)*

## CUNNIFF'S COP HOLDER FOR SHUTTLES FOR NORTHROP LOOMS.

A indicates the body of the shuttle, having a longitudinal opening A', extending completely through the shuttle to permit the ejection of one filling carrier at one side by the entrance of a fresh filling carrier at the other side. The shuttle is provided with holding means for the cop holder, being yielding jaws $a$, grooved on their inner faces, as at $a^1$.

The cop holder consists of a blade or skewer $b$ to receive the cop C, rigidly secured at one end to a head $b^1$, provided with annular ribs or projections $b^2$, which, in practice, enter between and are held by the jaws $a$ of the shuttle. The cop holder is thus held firmly at one end in the shuttle opening in position for the filling to be drawn off over the tip $b^x$ of the blade. The head $b^1$ of the cop holder is longitudinally recessed and receives the foot of an arm $c$, which is attached to the head, its foot passing under the ribs $b^2$ to prevent interference therewith. Between its free and attached ends the arm $c$ is laterally curved or offset to clear the cop or mass of filling when the latter is on the blade $b$, and at its free end this arm $c$ is provided with a delivery eye $c^2$ a short distance beyond and substantially in alignment with the tip of the cop holder, the filling $t$ passing through the eye as it is drawn off over the tip end of the blade without twisting or winding around it. This delivery eye being made a part of the cop holder it is unnecessary to have a thread eye in the shuttle, as the thread will run over the side of the shuttle body without trouble. The shuttle body is cut away at $a^x$, opposite the delivery eye of the cop holder, to permit the thread to draw off at the side of the shuttle rather than over the top.

The cop holder can be used in connection with either an eyeless shuttle, as before referred to, or a self threading shuttle. When used in connection with a self threading shuttle the new cop holder is ad-



vantageous in that the thread is positively carried down into the usual threading slot with which such shuttles are provided, thus tending to decrease the chances of a mispick occurring upon change of filling.

The delivery eye is made open—that is, with an entrance slot $c^3$—in order that the thread can be passed into the eye with greater ease, the slot being on an angle, so that under ordinary conditions the thread would not get out while the shuttle was in use.

The eye carrying arm is made elastic, or resilient, so that it can be bent slightly to one side when the cop is put on the blade or skewer. *(Draper Co.)*

## BEARDSELL'S FILLING DETECTOR FOR NORTHROP LOOMS.

Fig. 1 is a transverse section of a shuttle and filling carrier in about the line $x$, Fig. 2, said shuttle being provided with a detector finger and spring pad. Fig. 2 is a top view of a shuttle, on a smaller scale; and the detector finger and spring pad, the latter being in the position it will occupy when the finger is to indicate that the filling has been exhausted to the predetermined point.

D indicates the shuttle, $d$ the filling carrier, held frictionally between spring arms $d'$, and $d^2$ refers to a self threading device.

One side wall of the shuttle has a fulcrum pin or loop $e$, on which is pivotally mounted the detector finger $e'$, provided at its outer end with a projection

$e^2$ and at its opposite end with a spring pad $e^3$. The pivot pin $e$ receives and supports a spiral spring $f$, which is connected at one end to the said finger, the said spring normally acting to press the spring pad toward the filling carrier. When the filling carrier is full of filling, the filling mass will occupy the dotted line position. Fig. 2. and the filling, acting on the spring pad, will turn the detector finger $e'$ on its pivot $e$ in such position as to pull the end of the projection $e^2$ inside the body of the shuttle, and at

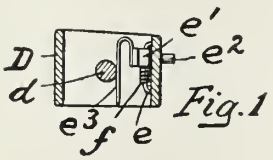


Fig.1

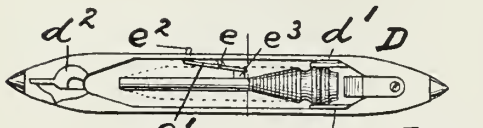


Fig.2

the same time the spring pad will be somewhat compressed. As the filling mass is unwound during weaving, the spring pad will gradually assume its normal state, and will be thereafter pressed against the filling mass by a force due to the spring $f$, and by the time that the filling mass is unwound to the predetermined point, the spring pad then bearing on the last layers wound on the carrier, the finger is moved far enough to push the projection $e^2$ out from the shuttle body far enough to meet a projection on the lay and by suitable arrangement permit a bunter on said lay to drop and effect the automatic removal of the carrier from the shuttle, and at the same operation put a fresh carrier in the shuttle, the free end of the spring pad being directed toward the under side of the shuttle, so as not to be struck by an incoming filling carrier. *(Draper Co.)*

## LITTLEFIELD'S COP SKEWER FOR NORTHROP LOOMS.

This cop skewer is an improvement over the one explained on page 97 of "Textile Machinery Part I."

Figs. 1 and 2 are views of the improved cop skewer, the head being shown in longitudinal section, and Fig. 3 is a perspective view of the head detached.

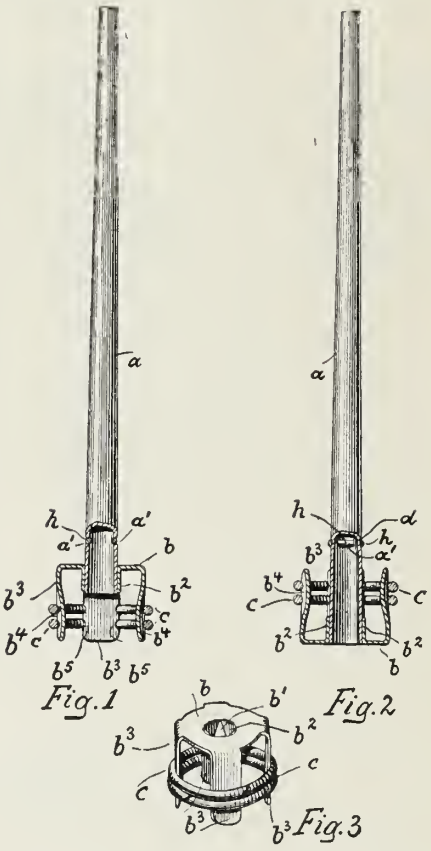
The blade $a$ of the cop skewer is shown in the illustrations as made hollow, however, if necessary a solid blade or a split spring blade could be employed with equal facility.

The head is made of sheet metal and comprises a base $b$, apertured centrally at $b^2$ to receive the base of the blade, inturned projections or lips $b^1$ at the sides of the aperture forming means to securely attach the blade and head by soldering. By bending the lips toward or away from each other the head may be adjusted to blades of different sizes. The base $b$ at its edge is provided with several bent over resilient arms $b^3$, four of such arms being shown in Fig. 3, said arms being transversely concaved as at $b^4$, toward their free ends and notched at their edges as at $b^5$. Annular metal ribs or split rings $c$ surround the arms, being seated in the notches $b^5$ thereof, the transverse concavity of the arms permitting the rings to be firmly seated and retained in place.

When the cop skewer is forced into the shuttle springs. the rings enter the usual grooves therein, the arms $b^3$ yielding slightly to the pressure, greatly reducing the wear on the shuttle springs.

In Fig. 1 the head is shown as attached to the blade $a$ with the arms $b^3$ extending in the direction of and beyond the base of the blade, while in Fig. 2 the head is reversed, the arms $b^3$ extending in the direction of the tip of the blade.

By using hollow blades, as shown, the device may be applied directly to the mule spindle in order that the yarn may be spun directly upon the cop skewer, but as the mule spindles vary in diameter the blade $a$ is at its lower end oppositely cut through or slotted, as at $a^1$, and a ring of rubber $h$ is slipped around the blade. This ring projects into the interior of the




blade at the slotted portions and acts to help grip the spindle when the blade is placed thereupon, the ring adapting itself to variations in the diameter of the spindle. If desired the exterior of the blade may have a slight annular groove $d$, Fig. 2, made therein to form a seat for the ring between the slots. *(Draper Co.)*

## COP SKEWER FOR THE USE OF WORSTED YARN BOBBINS IN NORTHROP LOOMS.

The object is to provide an attachment to the skewer for holding, *i. e.*, permitting the use of, the short worsted yarn bobbins in regular shuttles for Northrop looms.

Fig. 1 is a side elevation, of an empty bobbin, and the skewer. Fig. 2 is a top or plan view of the head

and connected blade of the skewer (wood) with the bobbin omitted, the attachment for holding the bobbin in place being shown on the head.

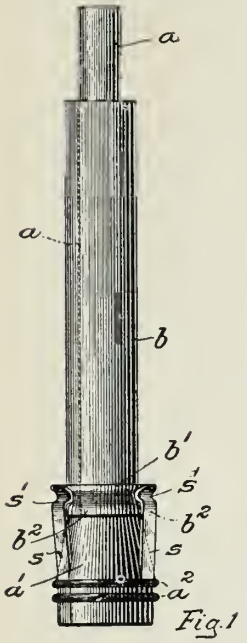


Fig. 1

$b$ is the body of the bobbin, the base $b'$ of it having an enlargement $b^2$ at its lower end. $a$ indicates the blade of the skewer, which is rigidly attached to a head $a'$, having thereon annular ribs $a^2$ to engage the holding jaws of the shuttle, the blade $a$ being long enough to project beyond the tip end of the bobbin $b$ sufficiently to be engaged by the finger at the outer end of the transferrer.

The head of the skewer is provided with three spring fingers $s$, secured at their lower end to the head and bent inward at or near their free upper ends, as at $s'$, to spring over the enlargement $b^2$ of the base of the bobbin $b$, thus forming a detachable connection whereby the bobbin is held in place. A longitudinal pull of the bobbin will release it from the grip of the spring fingers $s$, whereas a reverse movement pushes it against the head $a'$ and causes said spring fingers $s$ to spring into place, holding the bobbin to the skewer. *(Draper Co.)*

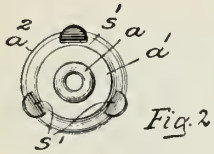


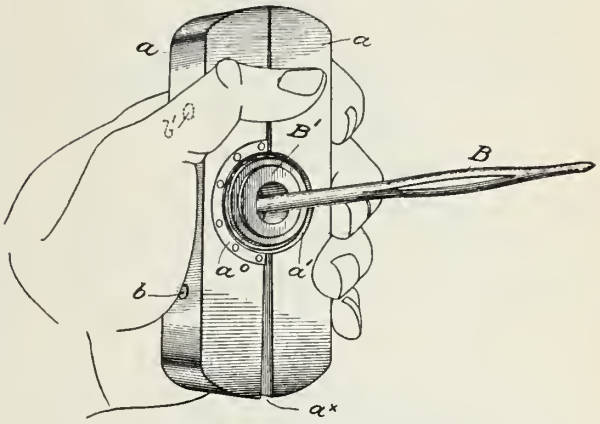
Fig. 2

## CUNNIFF'S HOLDER FOR COP SKEWERS.

In Northrop looms the cops of yarn must be put on the headed skewers by hand, the filling carriers so made being inserted automatically in self threading shuttles. While the base or head of the skewer is large enough to be firmly held in the shuttle it is not large enough to be held properly by the operative when putting a cop on the skewer. To simplify this putting on of cops to the filling carriers is the object of this holder, which is temporary used during this procedure.

The illustration is a perspective view of a skewer gripped in the new holder, which consists of a two part handpiece $a$, made of wood oblong in shape and connected at the top by a hinge. The adjacent inner faces of the parts $a$ are provided with semicircular recesses $a^1$, the open sides of which register when the parts $a$ are closed, forming a circular separable seat. Two studs $b$ $b^1$ are rigidly secured to one of the parts $a$, projecting from its inner face at opposite sides of the recesses $a^1$ and entering larger holes in the other part of the holder. Coiled springs surround the studs between the faces of the separable parts of the holder, said springs being seated in counter bored ends of the holes, the parts $a$ being normally held separated at the bottom by the springs, as shown in the illustration at $a^x$. The studs $b$ $b^1$ then engage the sides of the (larger) holes previously referred to in the outward situated part $a$ in the holder and act as stops to limit the opening of said parts.

When the operative desires to place a cop on the skewer B he grasps the holder in one hand, inserts the head $B^1$ of the skewer in the open seat and then closing his hand clamps the skewer head between the parts of the holder, the latter thus serving as a temporary handpiece, and while the skewer is thus held, the operative, with his free hand, places the cop on




the skewer. Upon relaxing the pressure on the holder the springs on the studs $b$ $b^1$ open it and the skewer is instantly released.

The seat, when closed, is slightly smaller than the skewer head in order to more firmly grip the latter, having a soft lining $a^\circ$, of yielding material applied to its side. *(Draper Co.)*

## HAMBLIN'S BOBBIN HOLDING DEVICE.

The object of the device is to provide an efficient form of bobbin holding device which shall be free from all tendency to break or otherwise injure the heads of bobbins.

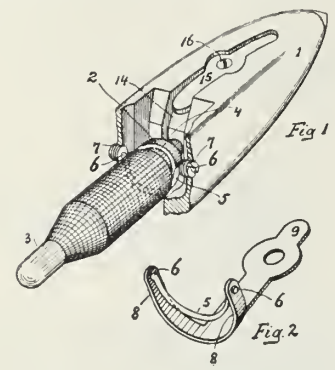
A second object is to provide for securing the shuttle spindle and the bobbin retaining device in place within the body of a shuttle and dispense with all horizontally disposed pins, screws or rivets having an end or ends thereof exposed at the sides of the shuttle body and liable to cause trouble or injury.

Three different modes of applying or mounting this retainer in a shuttle are shown in the illustrations, their action however being identical.

1 indicates the shuttle body, 2 the spindle, 3 the bobbin placed on said spindle, 4 is the circumferential groove which is formed in the head of the bobbin for the purpose of receiving the engaging portion of the bobbin retaining device. 5 designates the bobbin retainer, consisting of a loop, which is curved to correspond with the curvature of the head of the bobbin and is shaped and proportioned to fit within the groove 4 of the bobbin. The said loop is provided with journals 6, applied to bearings within the shuttle body, the body of the retainer hanging freely from the said journals, so as to render itself adjusting, seating itself properly within the groove 4 of the head of the bobbin. The loop 5 clasps and encircles the lower half of the bobbin, and thus the extent of the engagement of the holding device with the bobbin head is sufficiently great to insure adequate retention of the bobbin under all circumstances.

Fig. 1 shows the loop 5 with its journals 6, mounted in bearings in bushings 7 which are screwed into holes made for their reception in the walls of the shuttle body and which are employed in order to receive the wear incident to the working of the loop 5.

Fig. 2 shows the loop 5 with its journals 6 mounted in bearings provided in the upwardly extending arms 8 of a strip or plate 9, intended to be secured by means of a screw against the under side of the shuttle body, the said arms 8 extending upwardly within the shuttle cavity.



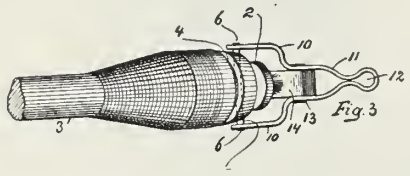




Fig. 3 shows the journals of the loop 5 fitted to bearings in the opposite arms 10 of a small yoke 11, bent at mid length, its arms being shaped to form the eye 12, then separated sufficiently to receive between them the head of the shuttle spindle, and then being more widely separated to enable them to pass on opposite sides of the head of the bobbin 3, leaving the said bobbin head free to move into and out of the shuttle cavity. The loop 5 is applied to these most widely separated portions of the yoke 11 and the shuttle spindle is connected with the yoke by means of a rivet 13 passing through the sides of the yoke and the head 14 of the shuttle spindle, the said rivet 13 thus constituting a pivot, on which the shuttle spindle is free to turn.

15 indicates a fixed spring acting against the head 14 of the shuttle spindle to retain the same in either its depressed position within the shuttle cavity, or in upraised position, for changing bobbin. For the purpose of securing the said spring 15 and the yoke 11 within the recesses which are provided for their reception in the proper end of the shuttle body, a single screw 16 is employed, the latter passing vertically through a hole in the spring 15 and also through the eye 12 of the yoke 11 and the threaded end thereof entering a nut which is located in a recess provided for its reception at the under side of the said end of the shuttle body (not shown).

When wear occurs between the head of the spindle and the sides of the yoke, such wear resulting from the turning of the spindle up and down and it giving opportunity to the spindle to play or wabble sidewise, the defect may be remedied by simply removing the parts from the shuttle body and hammering upon the rivet endwise, or otherwise compressing the sides of the small yoke more closely upon the sides of the spindle head. *(Stephen M. Hamblin and Wm. H. Goldsmith, Central Falls, R. I.)*

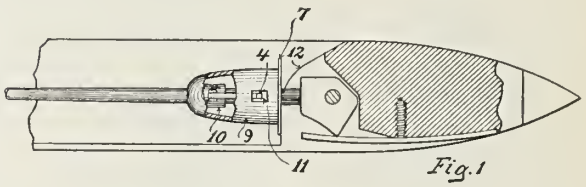
## ANOTHER BOBBIN HOLDING DEVICE.

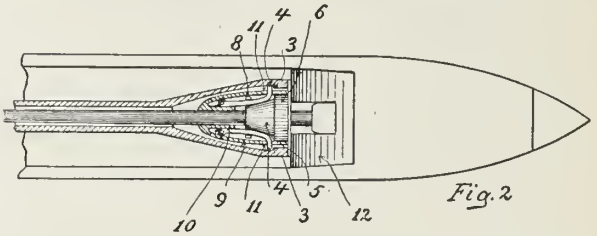
This device is combined with the spindle of a shuttle and positively locks the bobbin to the spindle when the latter is lowered from an upraised position into its normal position.

Fig. 1 is a sectional representation of that part of a shuttle to which the device refers. Fig. 2 is a partial plan view of a shuttle (corresponding to Fig. 1) having the device applied thereto, showing also a bobbin in horizontal section.

Examining Fig. 2, we find an internal shoulder 3 formed at the head end of the bobbin for engagement by the catches 4, as mounted pivotally on the shuttle spindle. 5 indicates a cone shaped expander, mounted upon the spindle, and being free to slide a short distance along it. The catches 4 are acted upon by the inclined exterior of this expander, which is provided at its base with a circular flange 6, while to the butt end of the expander is applied the disk 7 (see Fig. 1) exceeding the said flange in diameter. The small end of the expander is furnished with a flange 8 having opposite holes or slots through which the arms of the catches 4 pass. A tapering shell 9, corresponding somewhat in exterior form with the cavity in the head end of the bobbin, is connected with the spindle by being brazed at its small end to the sleeve 10. This shell encloses the catches 4, the free ends of which work through slots 11 in the shell.

When the catches are moved outward by the action of the expander, the free or engaging ends thereof project beyond the periphery of the shell. At other times they are retracted within the shell, so that they do not constitute obstructions to interfere with the operation of applying a bobbin to the spindle. The expander moves within the large open end of the shell, the said end fitting the periphery of the flange 6 of the expander and being supported by the said flange.




The bearings 12, which are provided in the shuttle to coact with the expander are constituted by projecting portions of the material of the shuttle body adjacent to the pivot for the spindle. These projecting portions or bearings are shaped so that when the tip of the spindle is depressed from an uplifted position into the shuttle cavity, the movement of the spindle will press the disk 7 carried by the expander against the said bearings, and the latter will act to crowd the expander along the spindle away from the pivot of the same, thereby expanding the catches 4. The upper portions of the bearings 12 are rounded away, so that when the shuttle tip is raised out of the shuttle cavity the expander will be relieved of pressure and will be allowed to drop by gravity slightly toward the pivot of the spindle, the slotted flange 8 acting to draw the catches 4 inward.

By the engagement of the bobbin by the catches 4 thus described, the former is held with the extreme

end of its head in contact with disk 7, and thereby endwise movement of the bobbin upon the spindle while the shuttle is in use, is prevented. *(Stephen M. Hamblin and Wm. H. Goldsmith, Central Falls, R. I.)*

## HAMBLIN'S SELF THREADING SHUTTLE.

The object is to provide means whereby the shuttle is automatically threaded, at the same time preventing the thread from slipping out of the eye during weaving.

Fig. 1 is a plan of portion of a loom shuttle having the self threading device attached. Fig. 2 is a side elevation of Fig. 1.

The device, is applied to the mouth of the shuttle and consists in an educt tube 7 inserted in the delivery eye of the shuttle, its length extending transversely across the shuttle.

In threading the shuttle, the thread, as drawn from the bobbin, is made to be caught under the tip of the threading tongue 9 of the educt tube 7, the portion of the yarn which is held in the hand of the weaver being carried rearwardly along the outer edge of the

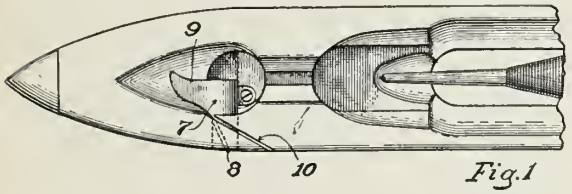


Fig. 1

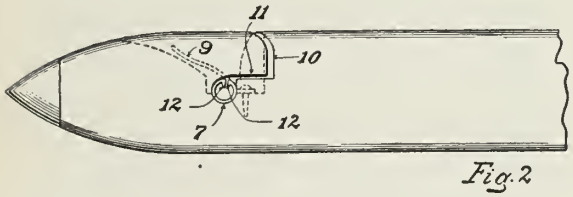


Fig. 2

tongue 9, and also along the rearwardly extending diagonal slit 10 in the shuttle body. It next is depressed by the weaver to carry it down in the slit 10, and in turn into the horizontal slit 11. Finally it is carried forward to draw it along the slit 11 to the slit 8 in the educt tube 7, it being depressed by the weaver to carry it through the slit 8 into the interior of the said educt tube.

12 designates inwardly extending lips which are provided at opposite sides of the outer end of the slit 8 in educt tube 7. These lips are separated from each other widely enough to permit the yarn to pass freely between the same in the operation of threading, but it is practically impossible for the yarn to find its way out between them again unless purposely aided by the hand of the weaver, thus positively insuring the thread against slipping out of the eye during weaving. *(The New Shuttle Co., Pawtucket, R. I.)*

## REINFORCEMENT RING FOR SHUTTLES.

The object is to prevent the splitting of the shuttle around the tip when said tip is driven in place.

Fig. 1 is an axial section of one extremity of a shuttle showing this reinforcement applied thereto. Fig. 2 is an end view of the shuttle body, showing it prepared to receive the ring and metallic tip.

1 indicates the shuttle body. 2 the tip, having the stem 3, which fits the central socket 4 in the end of the shuttle body. In Fig. 2, 5 and 6 are the inner and outer grooves, which are formed concentric with the socket 4. The reinforcing ring is made up of the inner flange 7, the outer flange 8, and the intermediate annular connecting portion 9.

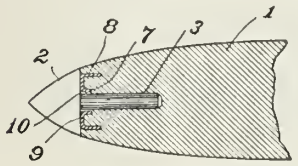


Fig. 1

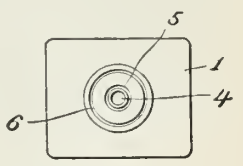


Fig. 2

10 designates the ring or shell of wood that is left between the inner groove 5 and the axial socket 4.

This reinforcing ring is made by striking the same from a blank sheet of metal, and thus it is produced cheaply, at the same time being made light and strong. *(The New Shuttle Co., Pawtucket, R. I.)*

## NASON'S SELF THREADING SHUTTLE.

The object is to produce a shuttle automatically threaded while in motion, the shuttle being provided with a thread keeper for preventing the thread from coming out of the shuttle eye during weaving.

Fig. 1 is a top plan view of the shuttle, and Fig. 2 is a cross sectional view of it, taken in line 3-3 of Fig. 1 showing the thread keeper device.

A indicates the shuttle body, *d* the thread passage, *d'* the finger for keeping the filling thread in the passage. B is the feeding pin. *a* is a straight thread passage and *a'* a lateral thread passage which communicates with the delivery eye. $d^2$ is a piece of hard metal fixed on the side of the keeper D just at the outer side of the thread passage *d*, so that the thread in running through the delivery eye will not wear the softer metal as used for making the body of the keeper. The thread from the filling carrier is passed downwardly in passage *a* on finger *d'* over the end of the finger and into and across the thread pass-

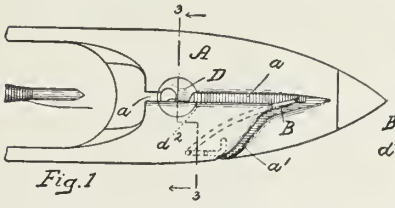


Fig. 1

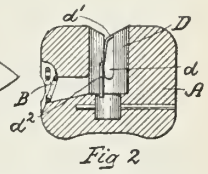


Fig 2

age *d*, whence it is carried to the delivery eye through the lateral thread passage *a'*. *(J. H. Nason, Somerville, and H. M. Hewes, Boston, Mass.)*

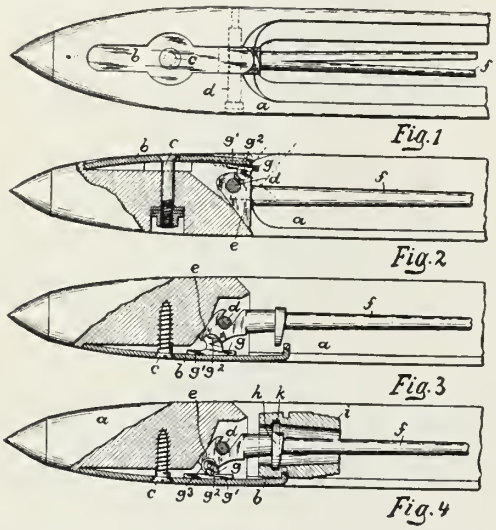
## ASHBY'S SHUTTLE.

The object is to reduce the wear on the spring, to secure a better hold on the bobbin and prevent longitudinal movement of the bobbin on the skewer.

Fig. 1 is a top view of part of a shuttle provided with a skewer, adapted for the use of a quill or cop. Fig. 2 is a longitudinal sectional view of the shuttle. Fig. 3 is a sectional view of a shuttle, adapted to use a bobbin. Fig. 4 is a sectional view of a loom shuttle, showing a modified form of a spring bearing.

*a* indicates the body of the shuttle, *b* the spring, *c* the screw by which the spring is secured and its ten-

sion adjusted, $d$ the pivot secured in the shuttle body, $e$ the heel of the skewer $f$. The bolster $g$ is interposed between the heel $e$ of the skewer and the spring $b$, and consists of the base $g'$, which has a long flat bearing on the spring, and the bolster $g^2$, which has a convex bearing in the concaved heel $e$ of the skewer.




In the modification shown in Fig. 4 the bolster $g^2$ is provided with the roller $g^3$.

When the skewer is raised at its free end to take off or renew a quill, cop or bobbin, the bolster slides on the spring, and, by reason of its extended surface, reduces the wear on the spring formerly caused by the angular edge of the heel, thereby increasing the durability of the spring.

To hold the bobbin more securely, the skewer $f$ is provided with the projection $h$ on the side coacting with the spring. This projection forms a short segment of a circle and can be made either to bear on the inside of the bobbin $i$ or to enter a groove $k$ formed on the inside of the bobbin. When the bobbin is inserted and in place, it is firmly held between the projection $h$ and the spring $b$. *(P. Ashby, Valley Falls, and John Shambow, Woonsocket, R. I.)*

## ISHERWOOD'S SHUTTLE.

The objects are to provide a mechanism to take the place of the usual pivot pin of the spindle, also providing an adjustable tension for the thread.

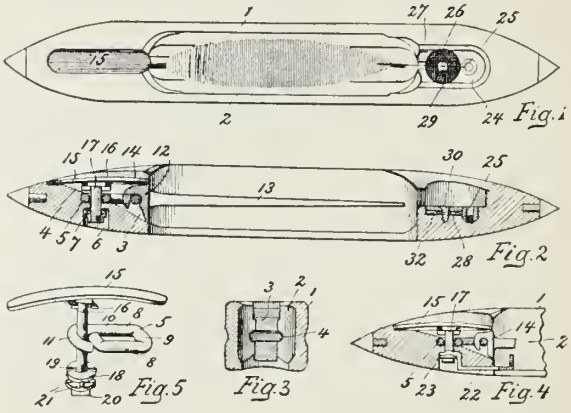
Fig. 1 is a plan view of this shuttle showing a full cop on its spindle. Fig. 2 is a central longitudinal sectional view of the shuttle, having the cop removed. Fig. 3 is a transverse sectional view of the shuttle body, the cop spindle and its supporting devices being removed. Fig. 4 is a longitudinal sectional view of one end of this shuttle constructed for using the filling spun on bobbins. Fig. 5 is a perspective view of the mechanism employed for securing the spindle in position within the shuttle body.

The shuttle body 1 is provided at one end of its filling opening 2 with a cavity 3, which communicates therewith and is gradually decreased in depth toward the outer or opposite end. At the longitudinal middle of the shuttle body the opposite walls, together with the intersecting bottom of the cavity 3, are provided with a groove 4, that portion thereof in the bottom forming a continuation of those in the sides. This continuous groove in cross section is slightly more than half round, it being designed to receive the spindle supporting yoke 5.

The under side of the shuttle body at about midway the cavity 3 is provided with a cavity 6, communicating with the cavity 3 by a bolt hole 7, connecting the upper end of the cavity 6 and the bottom of the cavity 3.

The yoke 5, includes the two opposite side bars 8, the end bar 9, the intermediate bar 10, and beyond the same the extended loop 11, between which and the intermediate bar 10 a space occurs. The yoke is caused to fit most snugly within the groove 4, into which it is slid endwise, the loop 11 of the yoke being to the rear and surrounding the bolt hole 7. The head 12 of the spindle 13 is provided with hook 14 for pivotally engaging with the cross bar 9 of the yoke, said cross bar serving as the pintle of the spindle.

The slightly bowed spring 15 is provided upon its under side with a pair of spaced apart parallel and horizontally disposed lips 16, and between which and the said spring the head of the bolt 17 is interposed, the body of the bolt being embraced by the said lips. The bolt passes down through and is embraced by the loop 11 of the yoke, which is adjusted to fit the same, whereby the yoke is prevented from withdrawal or any longitudinal movement whatever, and afterward passes down through the bolt opening 7 and into the cavity 6 in the under side of the shuttle body, where it terminates. A washer 18 is applied to the bolt at this point, the under side of the washer being provided with corrugations and its upper side with one or more ribs 19, the latter being forced into the shuttle body by means of a nut 20, the upper side of which is provided with ribs 21, which engage with the grooves in the under side of the washer, so that the spring drawing the bolt and nut upward (so as to facilitate such interlocking of the parts) and the bolt and washer being incapable of turning, no amount of jarring can loosen the nut. In addition to forming a part of the nut lock the spring 15 retains the spindle either in its lowered or raised position.




In shuttles where it is desired to employ a bobbin and is therefore necessary to employ a bobbin catch, the washer is omitted and, as shown in Fig. 4, the rear end of the bobbin catch is shaped to form a crimped head, with which the ribs on the upper side of the nut interlock. In said figure, 22 represents the bobbin catch, and 23 the crimped head that takes the place of the washer 18, the remainder of the parts being the same as before described.

In the bottom of the cavity 24 is set the pot eye 25, located nearer the end of the shuttle body, a

second communicating cavity 26 being formed between it and the throat 27, which leads to the filling opening. The bottom of this latter cavity is recessed to a depth slightly in excess, as indicated at 28, of that of the tension plate 29, which is designed to fit within the recess. A countersunk opening is formed in the center of the tension plate for the reception of an adjusting and retaining screw 30. Arranged under the plate in the bottom of the cavity is a light bowed spring 32, (see Fig. 2,) the tendency of which is to elevate the plate as far as is permitted by the said screw. The under side of the plate is perfectly smooth, but the upper side is roughened, in a manner similar to a file.

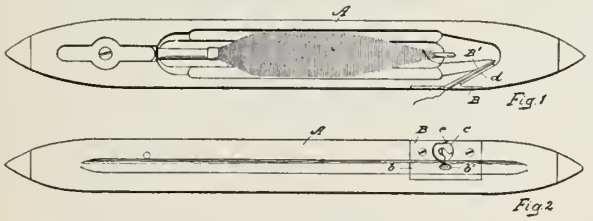
The thread passing through the throat of the pot eye will be caused to pass over this roughened surface of the tension plate and its movement will be more or less retarded in accordance with the position of the plate as adjusted and retained by the screw. With filling where no tension is desired, the plate may be reversed, so as to bring its smooth side uppermost. To increase the tension, the screw is rotated slightly, so as to raise the plate, and to decrease the tension, the screw is rotated in the reverse direction, so as to depress the plate correspondingly against the tension of the spring. *(Alfred Isherwood, New Bedford, Mass.)*

## LEVEILLE'S THREADING DEVICE FOR SHUTTLES.

This device, applicable to shuttles of ordinary construction, has for its object to guide the thread from the cop over a plate, about which it passes and from said plate to the eye, it being retained therein by a plate, which also forms a part of the fixture.

Fig. 1 is a plan view of a shuttle with cop in place, the threader being shown attached to the shuttle. Fig. 2 is a side elevation of it.

The shuttle body A is cut away on one side to receive the outer or side plate B of the threading attachment, which is secured in the recess. This plate B is provided with a longitudinal groove $b$, which is similar to the groove in the side of the shuttle body, and on a line with this groove $b$ is an eye $b'$. The plate B immediately above the eye has a recess, in which is secured a spring plate $c$, which either occupies the whole of the recess or is cut away, in




order to secure the desired amount of spring movement. This spring plate $c$ is secured to one side of the slot $e$ in the plate B, through which the thread is passed. From a point adjacent to the central portion of the plate B there projects at an angle a plate B', having its lower portion bent upon itself, so as to provide a tubular thread guide $d$, which is on a line with the eye $b'$, the upper portion having a prong or projection. The slot $e$, previously referred to extends through the attachment, excepting the spring, and connects with the eye and opening above the tubular thread guide $d$.

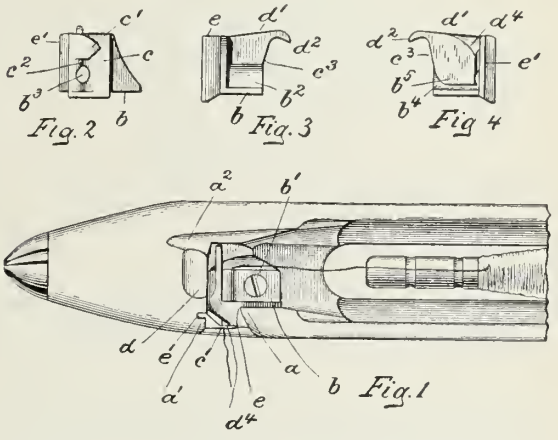
The threading attachment when completed is in a single piece, and the portion which projects within the shuttle body is of such a length that it will be practically on a line with the end of the bobbin, but is positioned at a considerable distance therefrom.

In threading the shuttle, it is only necessary to bring the thread over the prong of the plate B' and draw the thread toward the eye. The thread, following the slot $e$, enters the tubular thread guide and passes beneath the spring plate $c$. After the shuttle is threaded there is no liability of it becoming unthreaded, as the free end of the spring plate $c$ lies over the slot $e$. *(M. H. Leveille and John G. Smith, Worcester, Mass.)*

## RYON'S THREADING DEVICE FOR SHUTTLES.

The device consists in the construction of a self threading eye.

Fig. 1 shows a portion of a shuttle, provided with one of these eyes, Fig. 2 is a face view of the eye, Fig.




3 a right hand side view of the eye shown in Fig. 2, and Fig. 4 a left hand view of the eye as shown in Fig. 2.

The side wall of the shuttle is cut out for a short distance to leave a space with a **V**-shaped edge $a$, the opposite side of the space being provided with a groove $a^1$, and the top of the shuttle with a rather deep groove $a^2$.

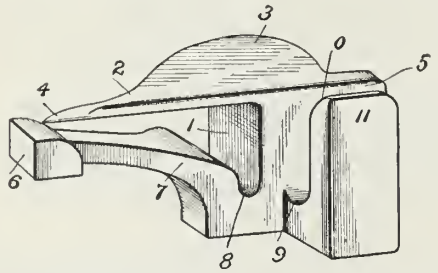
The eye is composed of a metallic block, consisting of a base $b$ which receives a screw $b^1$, said base having a thread guiding portion $b^2$, through which is made a thread passage $b^3$, presenting at one side a slot $b^4$, one side of said passage and one edge of said slot being formed by a depending lip $b^5$, down under which the thread must pass to enter said passage inside the shuttle body, to be led from said passage out from the face $c$ of the eye under the end of a pointed finger $c^1$, crossing a slot $c^2$, leading from the top of the eye into said passage. The lip $b^5$ faces the abutment $d$ of the shuttle body, and the upper part $d^1$ of said lip is extended backwardly from the slot $c^2$ into the body of the shuttle, its extreme end being provided with a hook $d^2$, which forms a continuation of the edge $c^3$ of the said lip. The eye has also a notched part $c$, which embraces the edge $a$ of the slot $c^2$ in the shuttle body, and it also has a projection $c^1$ to enter the notch $a^1$, and the upper part $d^1$ of the lip is rounded, as at $d^4$, to afford ready entrance of the thread into the slot $c^2$ and below the finger $c^1$.

To insert the thread, the weaver takes hold of the end of the thread and stretches it straight from the bobbin through the slot $a^2$ until the thread descends

in said slot below the hook $d^2$, when by a movement of the hand transversely of the shuttle the thread caught below the said hook is led into the space between the top $d^1$ and the abutment $d$ of the shuttle and is drawn down the inclined edge below the lower edge of the lip $b^5$ into the passage $b^4$, it, during such movement, being drawn past and below the finger $c^1$ and emerging from the passage $b^3$ at the face of the eye. *(E. H. Ryon and A. M. Goodale, Waltham, Mass.)*

## BURGESS' THREADING DEVICE FOR SHUTTLES.

The object is to provide means for preventing the filling thread from slipping out of the thread eye during weaving, also to prevent lint from gathering in the throat of the shuttle.




The illustration is a perspective view of the device, which is applied to the slot in the front end of the shuttle.

The device consists of a guide 5 formed by a lug 11 and having a concave bottom 9, the upper portion of said lug being rounded as at 0. From the lug 11, projection 1 extends, forming a horn 2 which includes a covering web 3, being formed with a point 4. Underneath this point 4 is a guard 6, rounded on its top to permit the filling thread to slip easily between said guard 6 and the point 4. The arm 7 which carries guard 6 is inclined toward the guiding slot 8 which directs the filling thread to the thread eye, said slot being curved on its edges to prevent the filling thread from chafing.

The filling thread as coming from the bobbin is lowered by the weaver into the guide 5, the end of the thread carrier between the point 4 and guard 6, then by the inclined arm 7 it drops into the guiding slot 8 and is carried out of the thread eye of the shuttle, said eye having at its sides two metallic studs (not shown) to prevent the thread from chafing. The illustration shows the device from the reverse side of the shuttle eye, the latter being situated in the side of the shuttle opposite slot 8. *(Daniel M. Burgess, Ramseur, N. C.)*

## DONOVAN'S TENSION DEVICE FOR SHUTTLES.

The purpose of this device is the regulating of the tension of the thread, besides equalizing said tension irrespective of the direction in which the shuttle is traveling.

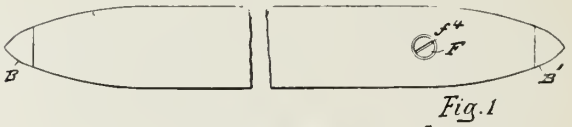
Fig. 1 illustrates a rear elevation of a shuttle provided with the device, Fig. 2 a plan of the same with a bobbin and cop, Fig. 3 a plan of the same, partly in horizontal section, on the line 3-3 in Fig. 4, Fig. 4 a front elevation of said shuttle and Fig. 5 a vertical cross section of said shuttle on the line 5-5 in Fig. 2.

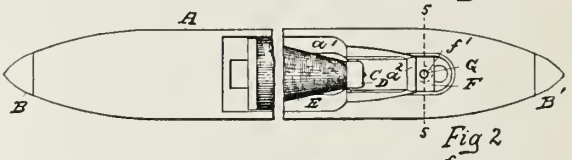
A represents the shuttle body, provided with a longitudinal guide groove $a$ in front, B B′ are the tips, C the spindle, arranged within the chamber $a'$, D a bobbin carrying a mass of filling E.

From the bobbin D the yarn is carried through the throat $a^2$ or narrow continuation of the chamber $a'$ to the tension devices, which consist of a cylinder F, which crosses the throat $a^2$ horizontally at about half way between the top and the bottom of the shuttle, and is retained in the body of the shuttle and prevented from accidental turning therein by a screw thread $f$, cut on the inner end portion of said cylinder. A hole $f'$ extends diametrically through said cylinder to receive the thread, which passes through said hole $f'$ and into a cavity G, arranged below said cylinder, and between the same and the adjacent tip B′ and thence through a passage H, which leads from said cavity G into the guide groove $a$ and through the delivery eye $h$.

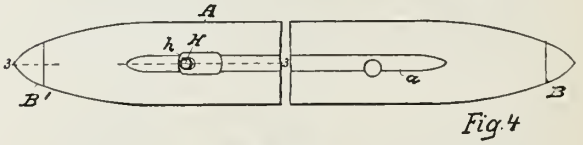
The ends of the hole or thread passage $f'$ are rounded out, as shown at $f^2$, $f^3$ in Fig. 5, to avoid fraying the thread, and the cylinder F may be turned by a screw driver inserted in a slot $f^4$, with which the rear or outer end of said cylinder is provided, as shown in Figs. 1, 2 and 3, to increase or diminish the angles at which the thread enters and leaves said thread passage $f'$, thereby increasing or diminishing the tension of said thread.

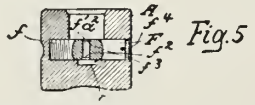
The passage H is inclined to the longitudinal axis of the shuttle from the cavity G toward the middle of the shuttle to equalize the friction of the thread as the shuttle alternately moves in opposite directions,








the longer contact surface and consequently the greater friction of the thread on the front of the shuttle as the shuttle moves in one direction (to the right in Fig. 3) being compensated by the greater angle which the passage H makes with the face of the shuttle on the left (in said Fig. 3) of said passage, while the thread after passing the sharper angle between the opposite side of said passage H and said face has much less contact with the shuttle. *(John J. Donovan, Lowell, Mass.)*

## HALL'S TENSION DEVICE FOR SHUTTLES FOR SILK LOOMS.

Fig. 1 is a plan and Fig. 2 a longitudinal section of a shuttle having this device applied.

The shuttle has a bridge, through the central portion of which is located the eye *b* and in the end of the

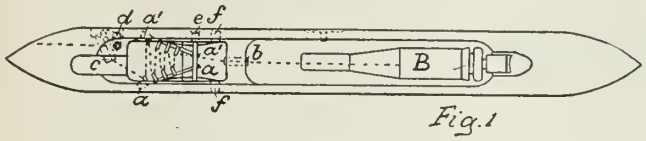



Fig. 1

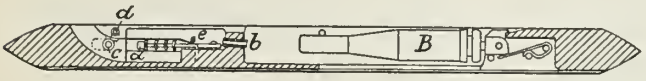



Fig. 2

shuttle is obliquely located another eye *c* and an upwardly slanting eye *d*, for conducting the thread in a direct line from the quill B through the eye *b*, through the four rings of the tension fliers *a a'*, alternately, through the eye *c*, the entrance to which is in a direct line with the eye *b* and the quill B, and to the loom, for weaving, through the eye *d*.

A tension spring is secured to the swinging end of the fliers *a* on one side thereof, and on the other side of the fliers are the four rings previously referred to. The ends of the fliers are bent at right angles, so as to be pressed down in the bottom of the shuttle, as is shown in Fig. 2, thus swinging laterally, and the shuttle is provided with a recess on each side of its interior to receive the tension spring and the end of the fliers, as is shown in both illustrations.

When so placed in position in the shuttle, the tension spring and fliers are prevented from rising therefrom by the screw *e*, as shown in Fig. 1. The tension spring is much longer than the arm of the fliers *a*, and is adapted to press against the side of the shuttle. Through an opening in each side of the shuttle a screw *f* passes and is screwed until it engages the tension spring, pressing it until the desired tension is obtained.

When the tension is regulated, there is the least possible danger of it being changed, because the pressure of the spring is against the rounded end of the screw, and the only way the tension may be released or lessened is by unscrewing the screw *f*. *(I. A. Hall, Paterson, N. J.)*

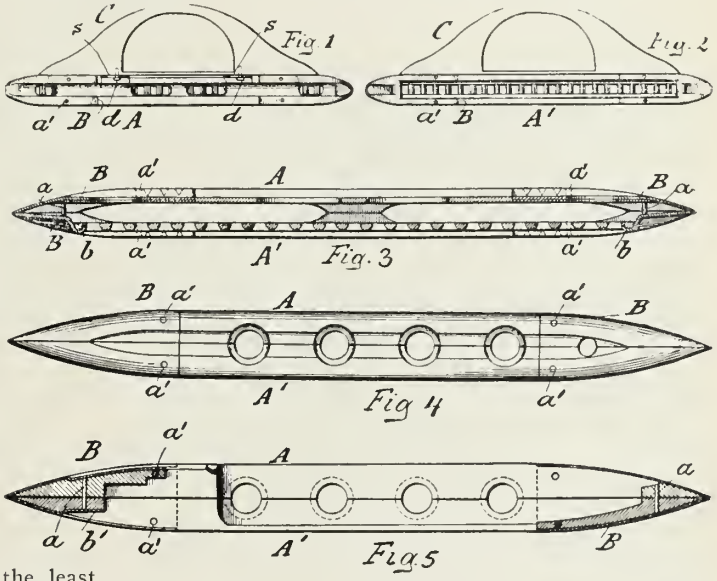
## HUSTER'S SHUTTLE FOR NARROW WARE AND BROAD LOOMS.

The body of the shuttle instead of being made of wood is made of aluminium and reinforced at the portions that are subjected to wear by thin sheet metal strips, thus producing a light, durable shuttle.

Figs. 1 and 2 represent a top and bottom view, respectively, of the shuttle as used for ribbon looms. Fig. 3 is a sectional view of the main part or body of the shuttle, with the spool holding portion detached, drawn on a larger scale. Fig. 4 is a side elevation of such a shuttle for broad looms and Fig. 5 is a vertical transverse section of the same.

A A' are two semisections of the shuttle, for both narrow ware and broad looms, and are made of cast aluminium, so as to keep the weight of the entire shuttle equal to if not below that of wooden shuttles. These semisections A A' are united by rivets *a*, and the ends and lower part, which are subjected to the greatest wear, covered by a capping layer B of sheet steel, which is placed in the mould before casting and retained on the cast metal by means of rivets *a'* and inwardly bent prongs or portions *b b'*, which are bent around and engaged over shoulders or ribs *a'*, as shown in Fig. 3.

The bow shaped support C (in Figs. 1 and 2) for the spool tension device, etc., is made of wood, and connected by means of headed studs *d* with the correspondingly slotted side wall of the metallic portion of the shuttle, as shown in Fig. 1, the slots *s* for said headed studs being provided with enlargements, so as to produce the rigid connection of the metallic portion of the shuttle with the wooden portion of the same. The reinforcing layers B of thin sheet steel




at the wearing parts of the shuttle are stamped up by dies, each section being provided with said reinforcing layers, which prevent the discoloring, especially of light fabrics, by the aluminium. *(Theodore Huster and Fred. W. Helms, Paterson, N. J.)*

## SCHAUM'S SHUTTLE FOR NARROW WARE LOOMS.

The object is to provide a shuttle with an increased bearing surface, and a shuttle block for said shuttle having a race way conforming in shape to the increased bearing surface of said shuttle.

The shuttle is also provided with a runner having its grain in the direction of the edges of the runner and its nose constructed of a separate piece of wood and secured to said runner.

Fig. 1 is a top plan view of this shuttle, Fig. 2 an underneath view of Fig. 1, Fig. 3 an enlarged sectional view on the line *x-x* of Fig. 1, and Fig. 4 a

view similar to Fig. 3, illustrating the shuttle in the race way of the shuttle block, the latter being shown in section and partly broken away.

The shuttle consists of the runner *a* and the nose *b*, which are glued together, at *c*. The runner is provided at its under side with a toothed rack *d* and at its outer lower portion with an elongated flange or projection *e*, rectangular in cross section. The upper portion of the runner *a* is provided at or near its inner edge with an elongated rectangular groove *f*, while the remaining top portion is flattened, as at *g*, and at right angles to the back *h* of the runner.

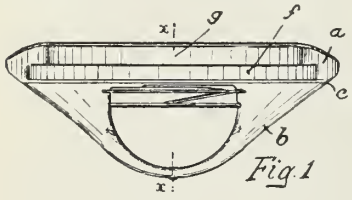


Fig. 1

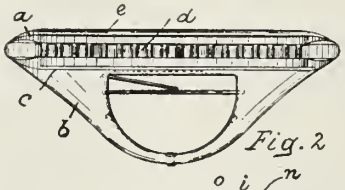


Fig. 2

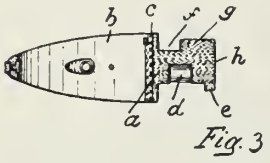


Fig. 3

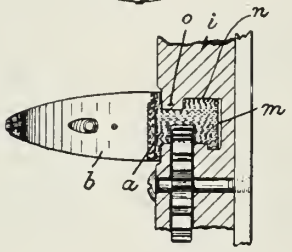


Fig. 4

The shuttle block *i* contains the shuttle race *m*, the top *n* of which is adapted to be engaged by the bearing surface *g* of the runner, while the downwardly extending projection *o* of the shuttle block *i* conforms in shape to and is adapted to engage the rectangular channel or groove *f* in said runner. The lower portion of the shuttle race conforms in shape to the lower portion of the runner, thus the runner of the shuttle furnishes an increased bearing surface with the top portion of the shuttle race, as its flattened portion *g* is in engagement with the flattened portion *n* in said block and by which arrangement the dropping of the shuttle nose is prevented. Owing to the fact that the runner is spaced from the rear wall of the race the contact between it and the walls of the race is minimized and confined only to points where such contact is absolutely necessary. *(Otto W. Schaum, Phila.)*

## HAMALIAN'S SHUTTLE FOR NARROW WARE LOOMS.

This shuttle is provided with bearings into which the spool supporting spindle can be readily inserted or lifted therefrom, and while in operative position is prevented from movement or accidental disengagement from said bearings.

Fig. 1 represents in its top plan view this shuttle, and Fig. 2 is a sectional view of it, on the line *x-x* of Fig. 1.

*a* represents the shuttle provided in its front portion *b* with an eye *c* and having a spring controlled brake *d*. The spindle *e* for the spool *g* (shown in dotted lines in Fig. 1) has its bearings in a socket *f* and in the recess *h*, respectively, which latter communicates with a groove *i*, arranged in the inner portion of the shuttle nose *b*. Within the said groove is pivotally secured at *m*, a latch *n*, adapted when in normal position to engage with its lower portion *o* the top surface of the spindle *e* to thus retain the latter within the recess *h*. A spiral spring *p* is provided for within the shuttle (in a hole or socket) and is connected with the top portion of the fulcrumed latch *n*, and is designed to hold said latch in normal position.

A collar *r* is arranged on the spindle *e* and is adapted to bear against the fulcrumed latch *n* to thus prevent undue lateral movement of the spindle.

For removing the spindle a notch *q* is furnished in the top portion of said latch *n* for conveniently turning the same on its fulcrum against the action of the spiral spring *p*, into the position shown in dotted lines in Fig. 2, whereby the lower portion *o* of said latch is moved out of the path of the spindle, which thus can then be readily lifted out of said bearings.

For reinserting the spindle into the shuttle, one end of said spindle is first inserted into the socket *f* and its opposite end thereafter slid into the recess *h*, the latch *n* being turned to one side by the spindle against the action of the spiral spring *p*, which latter as soon as said spindle has seated itself in the recess *h* returns said latch to its normal position. *(Schaum and Uhlinger, Phila.)*

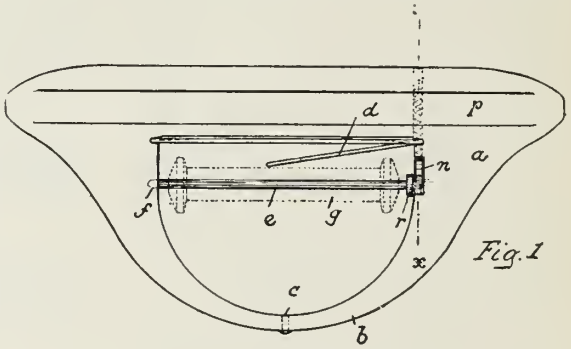


Fig. 1

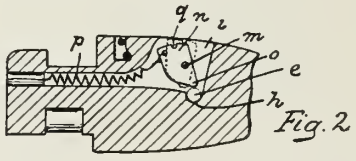


Fig. 2

## TENSION DEVICE FOR SHUTTLES FOR NARROW WARE LOOMS.

The object of the device is to provide a simple construction for retarding the spool of the shuttle more or less, according as the tension on the thread decreases or increases.

Fig. 1 is a plan of a shuttle provided with this tension device, and Fig. 2 shows another construction.

The shuttle comprises the support or body B, in which the spool *b*, is journaled.

As shown in Fig. 1, the brake consists of a plate *i*, set into the body B at *x* and normally held against the spool *b* either by its own elasticity or by a separate spring *j*, likewise secured to the body B and bearing against the brake plate *i*. The thread on the spool *b*, instead of passing directly through the hole *o* of the

shuttle, passes through a ring $k$, arranged on a guide $k'$ adjacent to the hole $o$, and thence through a loop $l$, formed on the brake $i$, finally passing out through the said hole $o$.

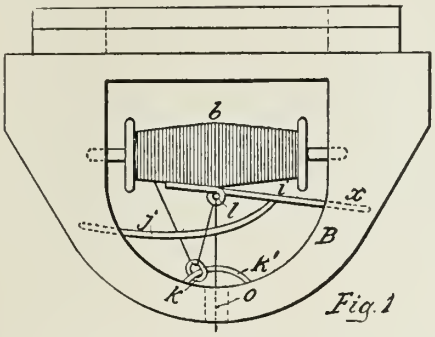


Fig. 1

The result is that the thread itself controls the brake and that according to the greater or less tension, which will vary according to the rate of travel of the shuttle, a retarding action more or less gentle is afforded by the action of the thread on the brake plate $i$. The thread itself will throw off the brake $i$ entirely, so as to do away with all retarding action when the thread is strongly drawn by an increased speed. In this case the spool unwinds without retardation. When the speed is slackened, the brake is steadily and progressively applied, so as to give the thread the tension necessary to a good feeding.

As shown in Fig. 2 the brake may be constituted by a bell crank lever $i'$, pivoted at $x'$ and acted upon by a spring $j'$. The free arm of this lever $i'$ is attached to a small spiral spring $r$, secured to a ring $l'$. A similar spring $r'$, arranged on the other side of the shuttle, is connected with a ring $l^2$. The thread passes first through the ring $k$, then through the rings $l^2$ and $l'$, finally coming out through the hole $o$. This construction produces the same effect as that shown in Fig. 1. The only advantage it possesses over the form first described resides in the keeping of the

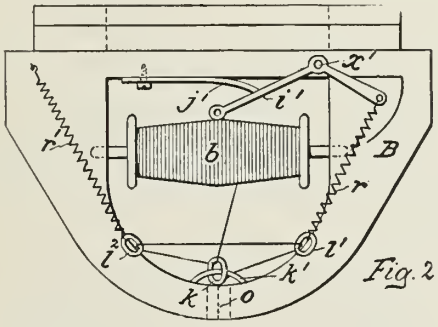


Fig. 2

brake behind the spool $b$, where it does not interfere with the work of the weaver. The difference between the two constructions shown, consists in causing the thread to act indirectly on the brake, as is the case in Fig. 2, instead of directly, as is the case of Fig. 1. *(Franeisque David, St. Etienne, France.)*

## TENSION DEVICE FOR SHUTTLES FOR SILK LOOMS.

The device consists of a rigid flat bar formed with a guide eye having a gap for the introduction of the thread or threads and a feather spring adapted to exercise controllable pressure upon the said bar, the said spring affording the necessary frictional pressure upon the threads which pass through the eye of the bar.

Fig. 1 is a side elevation of the device, and Fig. 2 a plan of the device.

$a$ represents a rigid flat bar which serves as support as well as guide for the thread or threads. That portion of bar $a$ which serves as support may be straight or curved in accordance with the character and construction of the machine, and is attached to a shank $b$. The portion of bar $a$ serving as guide for the thread or threads is straight and has an eye $a'$ for guiding one or more threads $c$ and an open slit $a^2$ for admitting the thread or threads to eye $a'$. Upon the face of the flat bar $a$ the flat spring $d$ is secured, the bar and spring jointly serving to apply tension to the thread or threads as they pass between the bar and spring. Where more than one thread is stretched, all the threads have thus an equal degree of tension applied to them.

To increase or diminish the degree of tension, the apparatus is fitted with a regulating or controlling device, consisting of a loop or "keeper," $e$, embracing

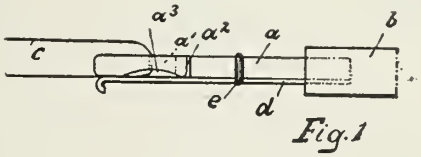


Fig. 1

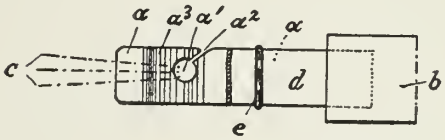


Fig. 2

both the bar and the spring and capable of being shifted either backward or forward to the desired extent. When the keeper $e$ is shifted forward, the threads will be stretched more tightly, the reverse result ensuing when it is moved backward.

In order to prevent the thread from being broken or chafed where emerging from the eye $a'$ the side of the bar $a$ facing the spring is formed with a curving recess $a^3$ communicating with eye $a'$, so that the thread reaches the point at which the frictional tension is applied gradually instead of suddenly. The curving recess $a^3$ extends forward from eye $a'$, toward the free ends of spring $d$ and bar $a$. The free end of said spring is bent in the form of a hook, so as to guard against the keeper $e$ becoming detached after the parts have been properly assembled. *(Isak Heer, Zurich, Switzerland.)*

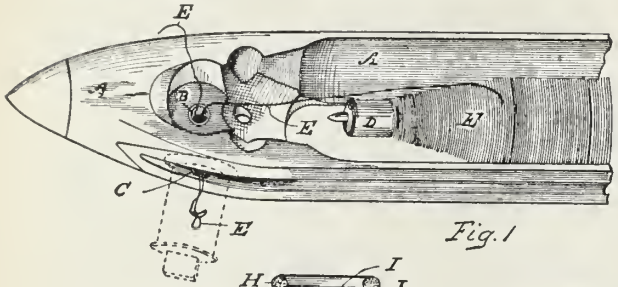
## LAMOTHE'S SHUTTLE THREADER.

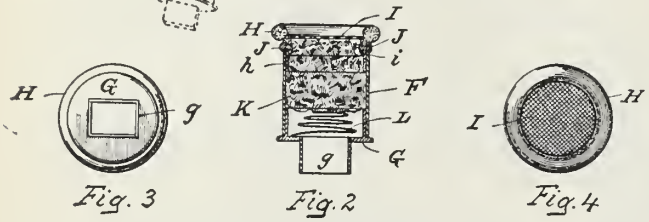
The object of this threader is to prevent inhaling of dust or lint by the weaver when applying his lips to the side orifice of the threading aperture of a shuttle and drawing the yarn or thread through by suction.

Fig. 1 is a broken perspective view, showing a portion of a shuttle and bobbin, and in dotted lines the suction threader in position as when having threaded the shuttle. Fig. 2 is an enlarged (compared to Fig. 1) detailed sectional view of the suction shuttle threader. Figs. 3 and 4 are end views showing, respectively, the mouthpiece and the rubber cushion and screen of the threader.

A is a shuttle, provided with the angular perforation located near one end and extending from the top

downward and out at one side of said shuttle, the top orifice being indicated at B and the side orifice at




C, said orifice constituting the threading aperture. D is the bobbin, and E is the thread or filling, the end of which filling is represented as having been somewhat snarled and drawn through the threading aperture B, C.

The threader consists of a tube or shell F, provided at one end with a cap G, having a mouthpiece $g$, and at the opposite end an annular rubber cushion H, provided with a sleeve $h$, extending within the shell F, and a perforated disk or screen I, having an annular flange $i$ fitting within the rubber sleeve $h$, secured therein by rivets J. The cap G is threaded to the shell F, so that it can be readily removed for the insertion or removal of a sponge K, placed within the shell F, for the purpose of preventing the passage of lint or dust from the shuttle into the mouth of an operator. The sponge K may be kept damp, if desired, and in order to prevent said sponge from expanding into the mouthpiece $g$, a spiral spring L is placed against it, so as to operate expansively between said sponge and cap, as shown in Fig. 2.

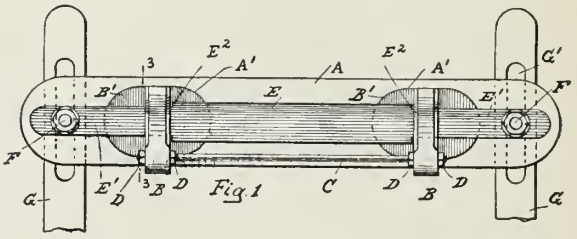
The weaver places the suction threader against a shuttle, so as to cover the orifice C, and the mouthpiece between his lips then sucks the free end of the filling E through the aperture B, C, when it may be pulled out as seen in Fig. 1. The rubber cushion H, is essential, in order that the suction threader may closely fit the side of the shuttle notwithstanding any uneven surfaces—such, for example, as the groove of the shuttle. *(Cyrille Lamothe, Manchester, N. H.)*

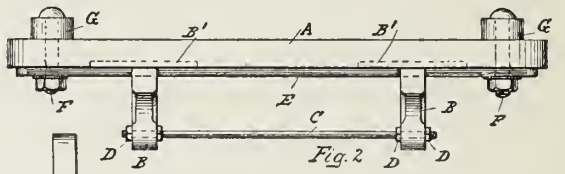
## MELVIN'S SHUTTLE GUARD.

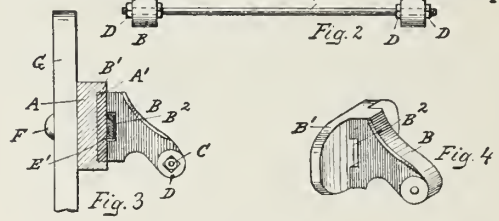
Fig. 1 is a front elevation and Fig. 2 is a plan view of this shuttle guard, shown applied to the lathe of a loom. Fig. 3 is a transverse section of the same on the line 3-3 of Fig. 1, and Fig. 4 is a perspective view of one of the brackets.

A indicates the hand rail which carries the shuttle guard, and which rail is provided with spaced recesses A′, for receiving the bases B′ of brackets B, extending forwardly from said rail to carry at their outer ends a rod C, secured in place by nuts D, screwing on the ends of the rod against the sides of the brackets B, both at the inside and outside thereof. The rod C extends a suitable distance from and parallel with the rail A, as is plainly indicated in Fig. 2, so that in case the shuttle leaves the shed and strikes the rod it is prevented from leaving the loom.

A connecting piece E in the form of a flat bar extends between the brackets at the bases B′ thereof, said connecting piece being formed at its ends with a reduced extension E′, passing through apertures $B^2$, formed in the brackets, so that the shoulders $E^2$, formed at the reduced ends, abut against the inner sides of brackets and hold the same the desired distance apart. The outer ends of the extensions E′ are engaged by bolts F for fastening the piece E to the rail A and the latter to the usual uprights G, attached to the loom. The uprights G are provided with the slots G′, through which extend the bolts F for adjusting the rail A up or down to bring the rod C



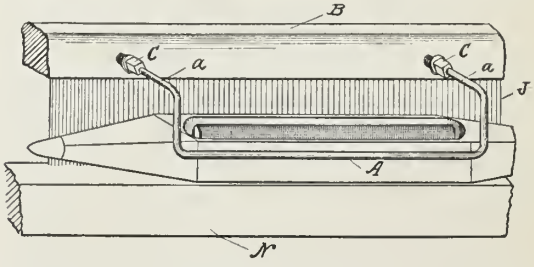




into the proper position for acting as a shuttle guard. *(Major T. Melvin, Fall River, Mass.)*

## NEWELL'S SHUTTLE GUARD.

The illustration is a perspective view of a portion of the raceway and the cap bar of a loom with the guard attached and the shuttle passing through back of the guard.

N indicates the race way, carrying the shuttle.




Over the reed J is placed the hand rail B, of the lay, to which is attached the guard rod A, being bent as at $a$, and secured to the hand rail B by means of set screws C. The guard rod A extends far enough in front of the lay to permit the shuttle to pass, and is of a length of about one half of the width of the cloth woven. *(Joshua B. Newell, Georgiaville, R. I.)*

# TEMPLES.

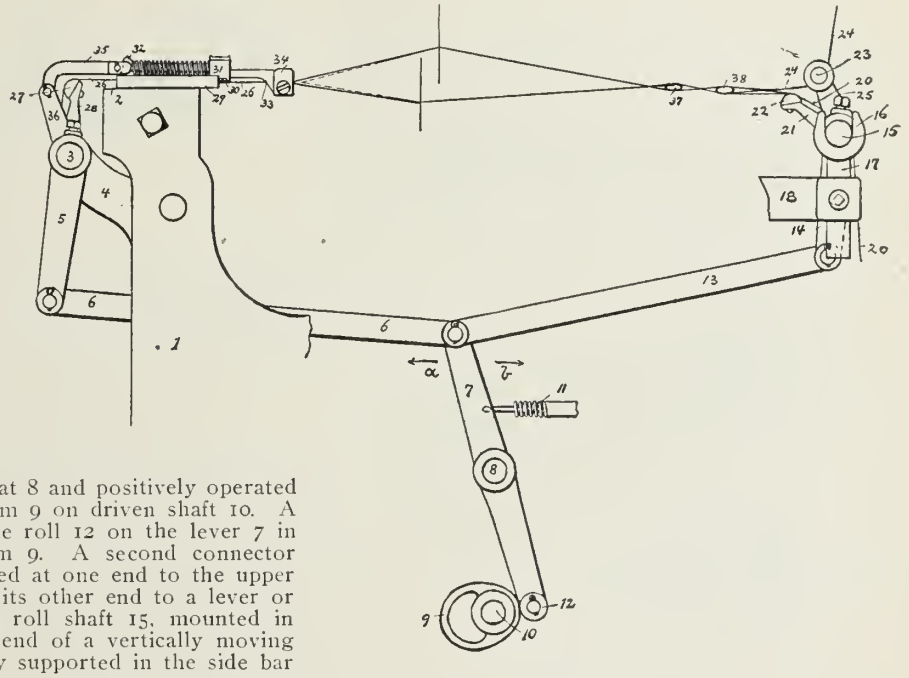
## HUTCHINS' TEMPLE MOTION.

for weaving terry pile fabrics, turkish towels, bath robes and similar articles. In the weaving of these fabrics (for the manufacture of which see pages 216 to 221 of "Technology of Textile Design") generally two picks of filling are put in, and then the woven fabric is moved toward the rear of the loom to allow the warp threads to be beaten up and form the sets of loops extending transversely of the fabric. In using temples of ordinary construction when the woven fabric is moved back, the edges thereof are drawn through the temple, causing the edges of the fabric to be more or less abraded and injured. This trouble is overcome by providing a motion, as shown in the illustration, whereby the temple is moved with the fabric, at the beating up.

1 indicates a detached portion of the right hand end or side of a loom, 2 the breast beam, 3 a rock shaft extending in front of the breast beam and mounted to turn in bearings on the arms or stands 4, bolted to the loom frame. An arm 5 is fast at its upper end on the rock shaft 3 and is pivotally attached at its lower end to one end of a connector 6, the rear end of which is pivotally attached to the upper end of the lever 7, centrally pivoted at 8 and positively operated at regular intervals by cam 9 on driven shaft 10. A spring 11 acts to keep the roll 12 on the lever 7 in engagement with the cam 9. A second connector 13 is also pivotally attached at one end to the upper end of the lever 7 and at its other end to a lever or arm 14, fast on the back roll shaft 15, mounted in bearings 16 in the upper end of a vertically moving bar 17, which is adjustably supported in the side bar 18 of the loom frame.

The back roll shaft 15 carries the back roll over which the warp threads 20 from the lower warp beam (not shown) pass, and also on arms 21, fast on the back roll shaft 15, the bar or whip roll 22 over which the warp threads pass. The back roll 23 under which the warp threads 24 from the upper warp beam (not shown) pass, is supported on arms 25 fast on the back roll as carried by shaft 15. The woven fabric 26 passes over a bar 27 in front of the breast beam 2 and supported on the arms 28, fast on the rock shaft 3.

On the breast beam 2 is secured the stationary plate 29 of the temple attachment, being mounted to slide in ways thereon in the direction of the length of the fabric, a plate 30 having stands or bearings 31 and 32 thereon, in which is supported to slide the longitudinally moving spring actuated rod 33 of the temple 34. The rear stand 32 of the temple plate 30 is connected by a link 35 to the upper end of an arm 36 on the rock shaft 3. The warp threads 20 and 24 are separated at the rear part of the loom by the lease rods 37 and 38, and the edge of the woven fabric in front of the fell point passes through the temple 34 and over the bar 27 in front of the breast beam to the take up roll. (Not shown.) When the lever 7 through cam 9 is moved to the left in the direction of arrow *a* and the woven fabric and warp threads moved back, through connectors 6 and 13, arms 5 and 14, shafts 3 and 15, and bars 22 and 27, to allow the warp threads to be beaten up to form the loop, the plate 30, carrying the temple mechanism, through link 35, connected by the arm 36 with the rock shaft 3, will, as the woven fabric is moved back toward the rear of the loom and forward toward the front of the loom in forming the loops, cause the temple plate 30 to be moved with it instead of remaining stationary. *(Crompton and Knowles Loom Works.)*

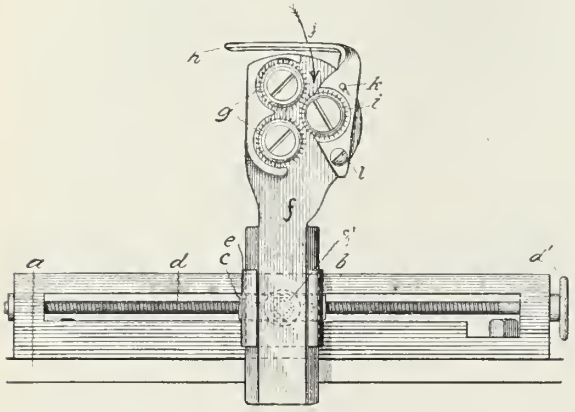



## HELD AND POEHNERT'S TEMPLE.

The object is to provide a temple being easy in adjustment with reference to width of cloth woven, as well as distance of temple head from the reed, at the same time providing a temple which will not injure the fabric since its stretching means only act on the outside edge of the selvage.

The temple is shown in its plan view in the illustration.

*a* denotes the breast beam of a loom, *b* a ways block bolted to the breast beam, the attachment between the two being one that gives the ways block and the parts it carries vertical adjustability, *c* denotes a nut




hung in the ways block upon the screw *d*, which is provided with the operating wheel $d^1$ for adjusting the temple to the width of the cloth to be woven. The nut *c* carries a smaller ways block *e*, in which the temple base *f* is carried and held in place by a set screw $f^1$, so that said temple base can be moved from or toward the fell of the cloth, as the case may require. *g* denotes two spur surfaced wheels rotarily attached to the loom temple base and set to revolve in a plane parallel to the plane of the cloth under retention when the loom temple is in use. *h* is a cloth guard pivotally attached at *l* on the upper face of the temple base and bearing thereon the spur surface cloth retaining wheel *i*.

When the temple is adjusted for use the inner edge of the spur surfaced wheel *i* intersects an imaginary line drawn through the outer edges of the spur surfaced wheels *g*, the outer edge of the selvage of the cloth (being turned down vertically) passing between the two spur surfaced wheels on the inside and the single spur surfaced wheel on the outside (the latter being held to place at such time by the pin *k*) receives the spurs projecting beyond the edges of all these wheels. Arrow *j* indicates the direction of run of selvage (and cloth) as passing from the fell of the cloth under cloth guard *h* into action of spur surfaced wheels *g* and *i*, as before described. *(Alfred G. Held and Edward Pochnert, Rockville, Conn.)*

## SYKES' TEMPLE.

The object is to provide a temple permitting ready removal of its shank and spring.

Fig. 1 shows the temple, closed, in working position, Fig. 2 shows the temple, the cap of the stand opened, and Fig. 3 shows by full lines, the stand cap open.

The temple head A contains the toothed roller (not shown) and the shank B having a shoulder *b* surrounded by a spiral spring *b'*.

The stand is secured to the breast beam by a bolt inserted through slot *e*, and is composed of a bottom plate *d*, to which is pivoted or hinged by pins *d'*, a cap $d^2$, the latter being so shaped as to overlap the spring *b'*, and leave along one edge of the cap a foot $d^3$, which is slotted for a part of its length at $d^4$, the said slot being shown as wider than the slot *c*, in the bottom plate *d*.

In one end of the slot *e*, is secured by a nut *e'* through slot $d^4$, a stud $e^2$, in the upper end of which is mounted a turn button $e^3$, having a stud screw $e^4$. When this turn button is in the position Fig. 1, the

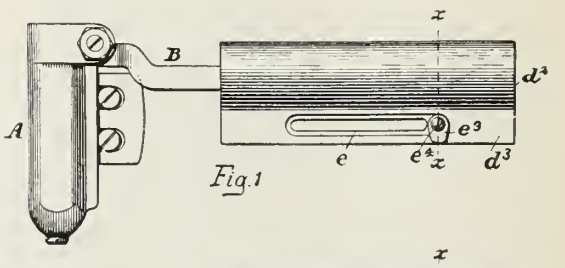



Fig. 1

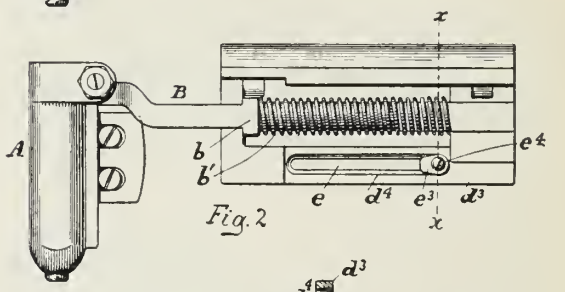



Fig. 2

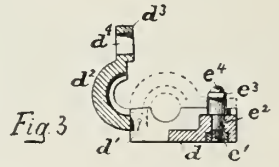



Fig. 3

cap will be held closed, but when the turn button occupies the position shown in Fig. 2, the cap may be raised and the bar and its spring may be removed. *(Draper Co.)*

## PAINCHAUD'S TEMPLE.

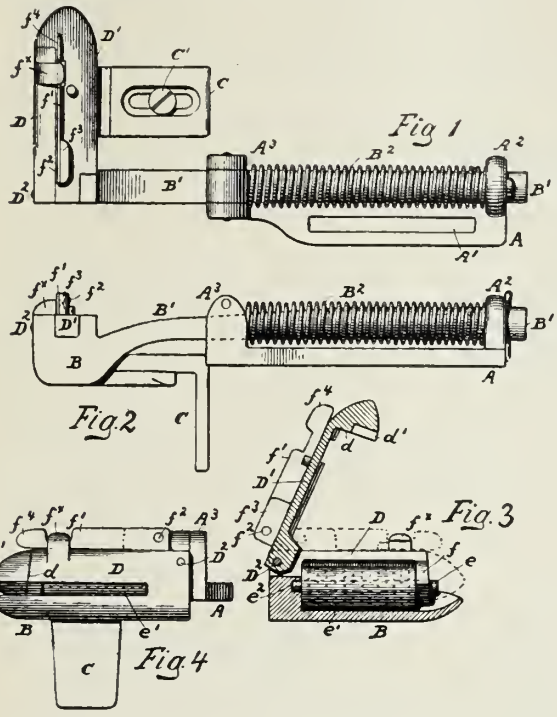
The object is to produce means so that the cap of the temple may be lifted as desired.

Fig. 1 is a top plan view of this temple, Fig. 2 is a side elevation thereof, Fig. 3 a sectional detail longitudinally of the pod and cap, with the movable part of the cap elevated, and Fig. 4 is a front end view of the temple in working position.

A is the stand having a slot A' for the screws for confining the stand in place on the breast beam, the said stand having guides $A^2$ $A^3$, and the shank B', having the pod B, and the spring $B^2$, surrounding the shank between the lugs $A^3$ and $A^2$, and the heel plate C, attached to an extension of the pod by screw C'. The cap is composed of a stationary portion D being integral with the pod, and a movable portion D', the movable portion being mounted upon a pin $D^2$ and having at its outer end a depending ear *d*, which is slotted at *d'*, (see Fig. 3,) said slot when the cap is closed, as in Fig. 1, fitting over the end *e* of the pin, on which turns the temple roll *e'*, said pin being longitudinally movable in a right angled extension or bearing lug *f* of the stationary part D of the cap, the inner end $e^2$ of said pin entering loosely a hole in a portion of the pod. (See Fig. 3.)

When the cap part D' is elevated, as in Fig. 3, the operator may, with pincers or otherwise, grab the end *e* of the pin and withdraw it to the right, viewing Fig. 3, thus removing the roll *e'*, if desired.

The stationary part D of the cap has a lug $f^x$, under which passes a spring $f'$, attached by a rivet $f^2$ to a lug $f^3$, rising from the top of the movable part D'




of the cap, said spring when in engagement with said projection $f^x$, serving to lock and retain the movable part of the cap in operative position; but the operator may, by pressing upon the end $f^4$ of the spring, disengage it from the said projection $f^x$, thereby leaving the movable part D' of the cap free to be elevated. *(Draper Co.)*

## PEARSON'S TEMPLE.

The object is the production of a temple, which when a pick out is to be made may be pushed back into its stand on the breast beam and its shank be turned one fourth about, so as to put the temple head entirely out of the way.

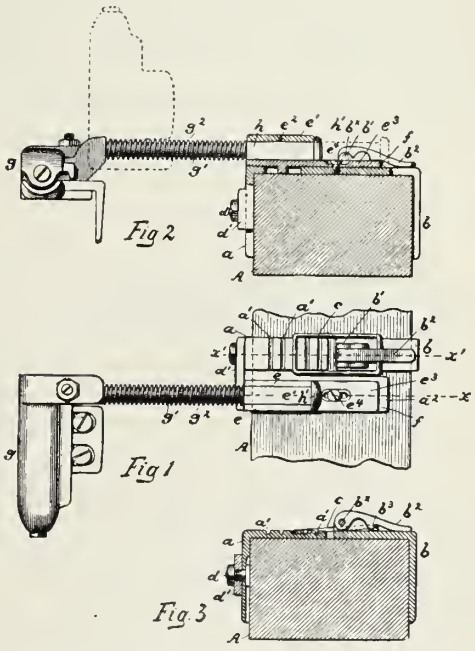
Fig. 1 in top or plan view represents a temple and stand and part of a breast beam, Fig. 2 a sectional detail in the line $x$ Fig. 1, and Fig. 3 a sectional detail in the line $x'$ Fig. 1.

The breast beam A is embraced by a two part clamp composed of angle bars $a$ $b$, the part $a$ having a series of notches $a'$, while the part $b$ has two ears $b'$, between which is pivoted at $b^x$ a locking lever $b^2$, having a lip $b^3$, which engages one end of a clamping loop or link $c$, the opposite end of said loop engaging one or the other of said notches $a'$ when the lever $b^2$ stands upright, so that turning the said lever over to the right, will effectually bind the clamping parts onto the breast beam, and by putting said loop into one or the other of the said notches $a'$ the clamp may be made to coöperate with any sized beam, the part $a$ having an extension $a^2$.

The right angled bar or part $a$ of the clamp has connected to it by a clamping bolt $d$ an arm $d'$, having rising from it two short side walls $e$, between which is a removable top plate $e'$, held in place, but removably, by a pin $e^2$, a tailpiece $e^3$ of said arm having a slot to receive a set screw $e^4$, by which to keep the tailpiece seated on the extension $a^2$, the head of the said screw being sunk flush into the tailpiece, the said walls and top plate $e'$ forming a guide or stand for the temple shank. The tailpiece terminates a little short of the extension $a^2$ to leave a shoulder $f$.

The temple head $g$, containing the toothed roll (not shown), has connected with it a shank $g'$ $h$, the part $h$ being flattened for the length of the walls $e$ of the stand and being fitted to slide therein, the remaining part $g'$ of the shank of the temple being reduced in size in cross section and rounded, the part so reduced being surrounded by a spring $g^2$. This squared shank slides in the box made between the side walls $e$, $e$ and the top $e'$, and the action of the spring $g^2$ normally keeps the said squared part between said walls, as shown by full lines in Figs. 1 and 2.

When, however, a mispick is to be taken out of the cloth, and it is desired to move the temple out of its working position, the head and bar may be pushed back until the squared part $h$ is removed from between the walls $e$, $e$ and the part $g'$, of reduced diameter, enters between said walls, and then the bar may be turned partially around, as shown by dotted lines, Fig. 2, and the edge of the stop $h'$ when the temple shank or bar is turned one fourth around will catch




behind the shoulder $f$ and the temple will be held out of operation automatically. *(Draper Co.)*

## CUNNIFF AND KERRIGAN'S TEMPLE.

The object is to provide means for maintaining the temple head yieldingly in operative position or retracted when it is desired to hold the temple head back in inoperative position, while leaving the hands of the weaver free.

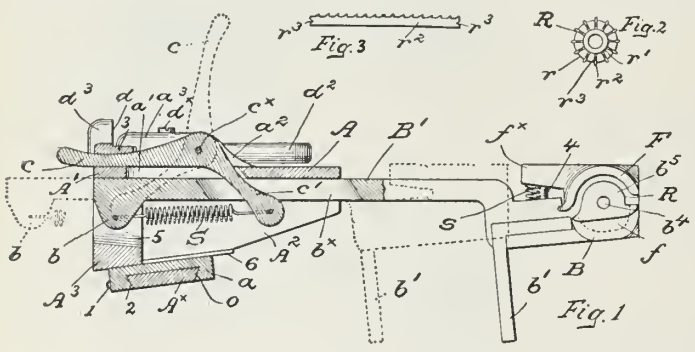
Fig. 1 is a longitudinal section of the temple, the end of the cap or pod being shown in elevation. Fig. 2 is an end view of the temple roll, showing the removable toothed blades, the retaining means therefor being omitted; and Fig. 3 is a side elevation of one of the toothed blades of the roll.

The stand A of the temple is provided with longitudinal internal guides $A^1$ formed in the upper portions of depending cheeks $A^2$, connected at their rear ends by a cross piece $A^3$, apertured at 5. The cheeks $A^2$ have at their lower edges ribs 6 to enter an undercut groove in a block *a*, the stand being adjustably held in the block by a set screw bearing against a thin plate interposed between one of the ribs 6 and the adjacent wall of the undercut groove in the block *a*. The under face of the block *a* has an undercut transverse groove *o* to receive a correspondingly shaped supporting plate $A^x$, on which the stand as a whole is adjustable in a lateral direction, a set screw 1 and bearing plate 2 holding the stand adjusted.

The shank $B^1$ of the temple head enters and is longitudinally movable in the guides $A^1$ of the stand, the rear end of the shank being increased in width to form shoulders, bearing against shoulders at the rear ends of the guides $A^1$ to limit the outward movement of the shank.

The top of the stand is longitudinally slotted at $a^1$, to receive the depending arm $c^1$ of a bent lever, the other arm *c* extending above the stand, the arm $c^1$ constituting a controller for the shank fulcrumed at $c^x$ in ears $a^2$ on the stand.

The arm $c^1$ passes through a longitudinal slot $b^x$ in the stand, and has attached to it one end of a coiled spring S, the other end of the spring being fastened to a depending lug *b* at the rear end of the shank $B^1$, the length of the spring being such that when the controller is in normal position (see full lines in illustration) the spring will be under sufficient tension to maintain the shank and temple head in operative position. When, however, the controller is thrown into position, as shown by dotted lines in the illustration, the spring will be compressed sufficiently to act upon the lug *b* and retract the shank into this position, the controller being past dead center, the lug *b* moving through the opening 5 of the cross piece $A^3$ of the stand. The controller *c* $c^1$ thus operates through the spring to maintain the temple head in operative position or retracted, as may be desired.




In order to keep the controller in normal position, so that the shank will be projected by the spring, a locking device is provided, being a latch *d*, notched to overhang and receive the arm *c* and being pivoted at $d^x$ on a lateral projection $a^3$ of one of the ears $a^2$ of the stand, the latch *d* being prolonged to form an operating handle $d^2$ and reduced as shown at 3, to pass under the projection $a^3$. The face of the upturned end of the latch above its notch, is convexed, as at $d^3$, in order to act as a cam when engaged by the arm *c* as the controller is moved into normal position, a spring (not shown) pressing the latch inward toward the controller.

When it is desired to retract the temple head, the latch *d* is retracted, releasing the arm *c* of the controller, which immediately rises above the notched portion of the latch by reason of the tension of the spring S, and then the weaver swings the controller over into dotted line position shown in the illustration, retracting the shank and temple head, as described, and maintaining it back. When the carrier is returned to normal position, the latch yields as the arm *c* passes over the cam face $d^3$ and into the notch of the latch *d*, when the controller is locked.

The pod B, having a depending leg $b^1$ to be struck by the lay as it beats up, forms a part of the outer end of the shank $B^1$, and it has a recess to receive a rounded shoulder *f* of the cap F, which latter is mounted to rock on a pivot forming a support for the cylindrical toothed roll R.

In the illustration the cap is shown as provided at its inner side with a rearwardly extended ear $f^x$, between which and the top of the adjacent part of the shank is interposed a spring *s*, which lifts the ear and tips the cap on its fulcrum to depress the outer edge of the cap F. A headed screw threaded stud 4, passed loosely through the ear and into the stand, acts as a stop to limit the spring induced movement of the cap F.

The cloth passes between the edges of the cap and pod, over the toothed roll, and out beneath the edge of the cap, the lifting tendency of the cloth to separate from the teeth being yieldingly counteracted by the spring *s*.

The pivot of the cap F extends from one to the other end of the pod and is threaded at $b^4$ to enter a threaded hole in the upturned end $b^5$ of the pod, the roll R being rotatably mounted on said pivot and comprises a body portion, a plurality of detachable toothed blades, and means to retain the blades in place on the body portion, the latter being a cylinder *r* (see Fig. 2), longitudinally bored to receive the pivot of the cap F and having its ends reduced, as at $r^1$, and exteriorly threaded. Longitudinal grooves or seats are made in the body of the roll R to receive each a toothed metal blade $r^2$, the blades having their ends notched as at $r^3$ (see Fig. 3), the blades being substantially as long as the body, exclusive of its reduced ends $r^1$. Retaining collars having on their inner faces annular ribs, are slipped onto the extensions $r^1$ of the body portion and against the ends of the blades, the ribs entering the notches $r^3$ of the latter to hold the blades in position on the body, and to prevent removal of the rings or collars, nuts are screwed upon the extensions $r^1$ up snugly against the rings, thereby firmly holding the blades in place, yet permitting of their ready removal should one or more tecth of a blade or blades become bent or broken. *(Draper Co.)*

## ALLEN'S TEMPLE.

The object is to provide a temple which can be readily removed from its stand when required.

Fig. 1 is a top view and Fig. 2 a side elevation of this temple, the head and shank being shown in Fig. 2 in dotted line position as ready to be removed from or inserted into operative position on the stand.

The stand A is provided with a slot *a* which receives a bolt for securing said stand to the breast beam and has at its rear end an upturned ear $a^1$ having a hole $a^x$, the bottom of which is beveled rearwardly and downward, thus permitting tipping of the temple shank B, giving it a chance to be readily removed from the ear $a^1$.

At its front end the stand is provided with two up-

turned ears $a^2$, having undercut grooves or guideways $a^3$ extended from the rear ends of the ears towards the front of the stand where they form stops $a^4$. The temple shank B, which is adapted to slide on the stand A, has attached to it two projections $b$ which slide in the guideways $a^3$. The rear ends of the ears $a^2$ are notched as at $a^5$, so that when it is desired to maintain the temple retracted without removing it altogether from the stand, the head is simply pushed back until the projections $b$ rest against notches $a^5$. Spring S is coiled around the shank and maintains the temple head D pressed outward, with the projections $b$ against the shoulders $a^4$.

The guideways $a^3$ prevent the shank from lifting when the loom is weaving, but when it is desired to remove the temple for picking out purposes, etc., the shank is simply pushed back until the projections $b$ are free of the guideways, when the shank is tipped into the position shown in dotted lines in Fig. 2, the beveled bottom of the hole $a^x$, as previously mentioned, permitting such tipping of the temple shank, which thus can be withdrawn bodily from the ear $a^1$. In order to put the temple back the operation is reversed.

The pod of the temple is provided with a yielding rib $b^2$, made of a piece of flattened wire, bent transversely as at $b^3$, and which rib keeps the cloth firmly pressed against the burr, which consists of detachable toothed blades $g$ held in grooves cut on the roll, said blades being held at their ends by collars $f$, which arrangement permits the ready removal of any blade becoming bent or broken for one or the other reason. *(Draper Co.)*

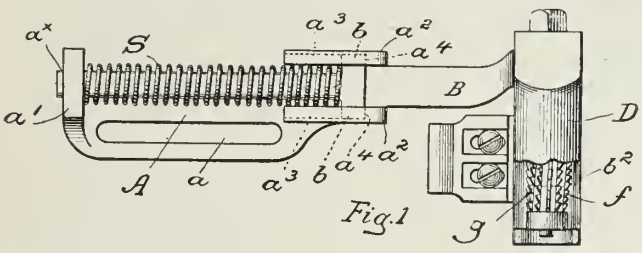


Fig. 1

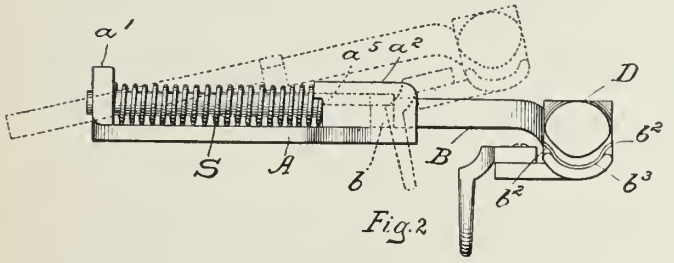


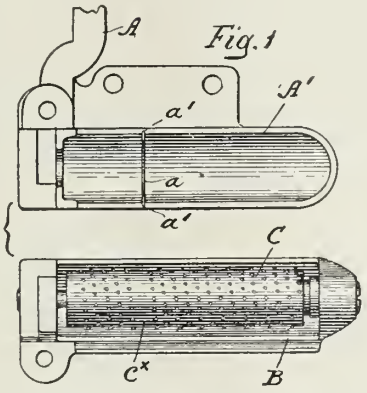
Fig. 2

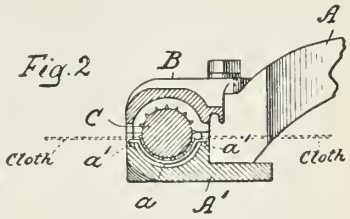
## STIMPSON'S ATTACHMENT TO TEMPLES.

The object of the attachment consists in pressing the cloth by means of a wire rib positive against the toothed roll in order to insure the engagement of the teeth with the cloth.

Fig. 1 shows the temple pod and the cap opened out. Fig. 2 is a transverse sectional view of the temple.

A indicates the slide bar, A′ the rod attached thereto, B the cap and C the rotatable toothed roll. The concave bottom of the pod has added a transverse rib or projection $a$, formed of a piece of wire bent to follow the curvature of the roll and partially encircle it and is secured in place by having its downturned ends $a'$ inserted in holes in the side walls of the pod. In order to prevent interference of the rib with the teeth of the roll C one spiral or row of teeth on the roll is omitted, thereby leaving a clear or smooth band $c^x$ around the roll opposite the rib or projection $a$.




As the cloth passes through the temple and over the rib the latter raises it and causes it to approach the roll very closely, so that the teeth are absolutely sure to engage the cloth.

The directing rib or projection as made of wire, will yield by reason of its elasticity, which is an advantageous feature, particularly should the cloth vary in thickness. *(Draper Co.)*

## THREAD CUTTING ATTACHMENT FOR TEMPLES.

The purpose of this attachment to temples is to provide a positive action to cut the ends of filling which are left hanging from the selvage of the cloth in the weaving of the same. This temple is similar to the one described on page 116 of "Textile Machinery Part I," being provided in this instance with a thread cutter.

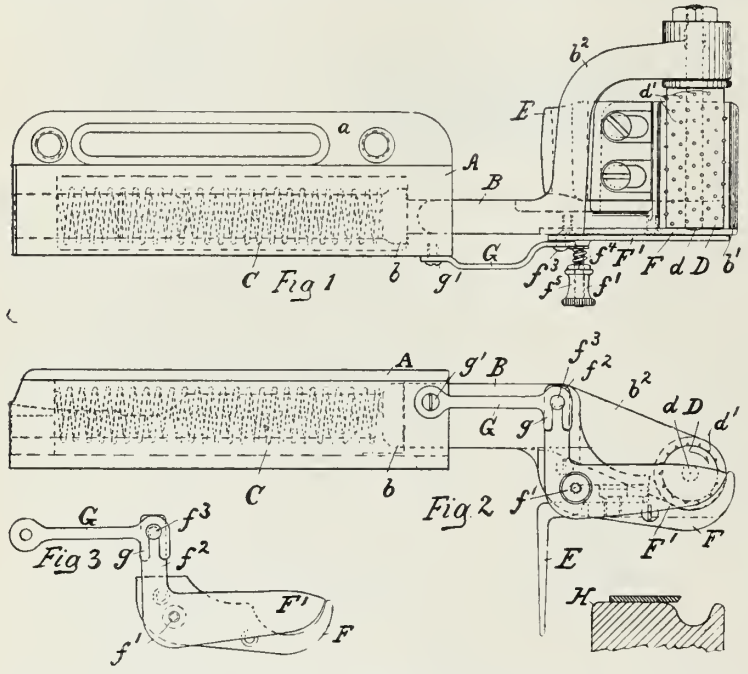
Fig. 1 is a plan of the temple provided with the attachment, Fig. 2 is an outside elevation of the same, and a vertical section of the race board of the lay, and Fig. 3 is a similar elevation of this thread cutting device detached.

A indicates the case having an attached slotted plate $a$, B the temple shank provided with a collar $b$, and carrying the spring C. $b'$ is the pod, D the temple roll with its spindle $d$, which is supported by the arm $b^2$ as attached to the temple shank. E is the heel, $d'$ the teeth of the roll and H the lay.

In former constructions of thread cutting devices a stationary washer having a cutting edge was secured to the cover used above the temple roll, while another blade was secured to the temple roll.

In the present construction we find secured to the outer face or side of the pod $b'$ a stationary vertical blade F, the cutting edge of which is curved to the shape approximately of the upper surface or trough of said pod. The other or movable blade F′ of the device is pivoted at $f'$ on the temple head and is provided with an upwardly extending arm $f^2$, having a lateral projection or stud $f^3$, adapted to be engaged by a hook $g$ on one end of a link G, the other end of said link

being pivoted at $g'$ on the case A in such a manner that by raising the hook $g$ of said link the temple bar and the parts supported thereby may be separated from the case A when necessary. A spiral spring $f^4$ is interposed between the head $f^5$ of the pivot $f'$ and the movable blade F' to hold said movable blade in contact with the blade F. The shear blades F F' are normally open sufficiently to allow the filling ends to pass between them and are closed to cut off said ends when the lay H, in beating up, strikes the heel, owing to the resistance of the link which prevents the yielding of the upper end of the arm $f^2$, thus the action of the device does not depend on the movement of the temple roll, but is entirely independent thereof, and therefore cannot injuriously affect the operation of said roll on the cloth. *(Draper Co.)*




## THREAD CUTTING TEMPLE FOR NORTHROP LOOMS.

This temple is of similar construction to the one described on pages 114-115 of "Textile Machinery Part I" and has for its object to provide a cushion to break the force of the blow of the lay on the temple.

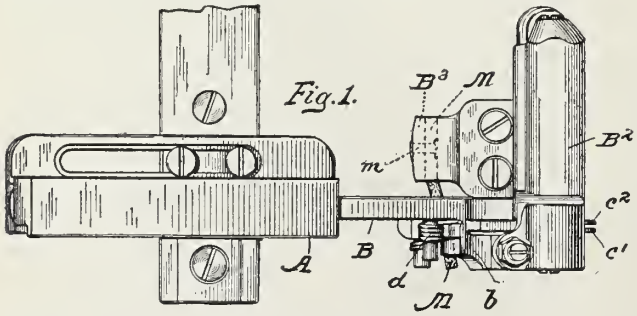
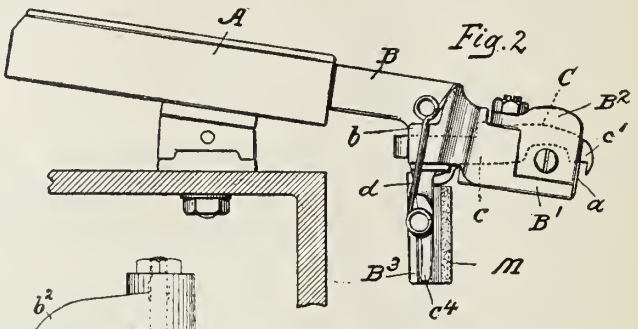


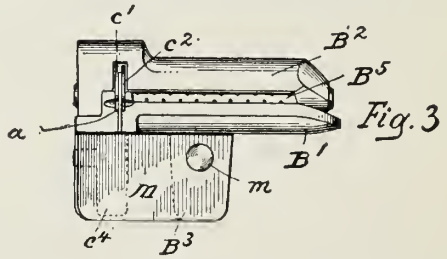

Fig. 1 is a top or plan view of this temple, Fig. 2 a side elevation and Fig. 3 a front end elevation thereof.




A indicates the stand which is secured to the breast beam of the loom, B the slide bar having pod B', $B^2$ the cap, $B^3$ the heel attached to the pod and $B^5$ the toothed roller for grasping the cloth.

*a* is the blade in the slotted pod, *b* is the slotted ear on the bar B to receive the body *c* of the thread cutter C, (shown as slotted to leave two hooked arms $c'$ $c^2$, and straddling the blade *a*,) and *d* is the spring, one end of which engages the heel $c^4$ of the cutter to retain the same in its normal forward position, with its cutting end out of the plane of the filling end.

Upon the heel $B^3$ of the temple there is attached a leather cushion M, held in place by a rivet *m*, the cushion passing across the front of the heel and extending laterally in front of the heel $c^4$ of the cutter, but unattached thereto. This cushion is thus interposed between the two heels and the lay and breaks



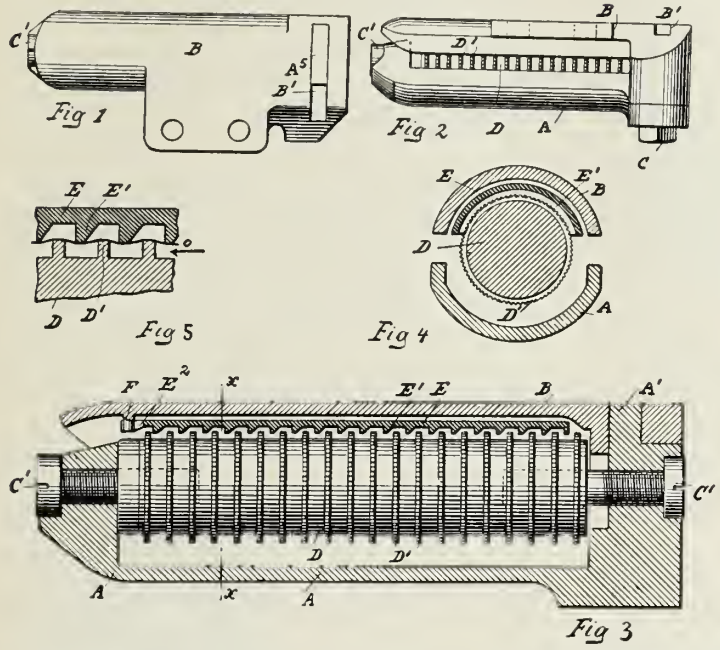

or relieves the force of the blow. Whatever the adjustment of the temple, the cushion is always in proper position. It is in plain sight of the weaver and can be readily renewed when worn and being small in extent is readily secured in place. *(Draper Co.)*

## DUFFY'S TEMPLE.

The object of this temple is to permit of drawing the cloth longitudinally and to keep the same properly extended in a transverse direction at all times to allow

of properly beating in the filling by the lay without injury to the cloth and to relieve the selvage from all chafing.

Fig. 1 is a plan view of the temple. Fig. 2 a side elevation of the same. Fig. 3 an enlarged sectional side elevation of the same, Fig. 4 a transverse section




on the line *x-x* of Fig. 3, and Fig. 5 an enlarged sectional side elevation of part of the roll and cover with the cloth in position.

This temple is provided with a bottom jaw A and a top jaw B, both secured together at one end by a bolt C, the bottom jaw being provided with a tongue A', fitting into a correspondingly shaped groove B', in the top jaw B, so as to hold the jaws in proper position relatively to each other. In the ends of the lower jaw A are secured the trunnions C', on which is mounted to turn loosely a roller D, held against sliding on the trunnions and provided with spaced annular ribs D', formed with fine teeth at their peripheral surfaces.

In the concaved under side of the jaw B is held loosely a cover E, made segmental in cross section, (see Fig. 4), and formed at its under concaved face with spaced ribs E', adapted to extend between the ribs D' of the roller D, as shown in Fig. 3. The front edge of each of the ribs E' is disposed in a vertical direction, while the back of each rib is inclined so as to come close to the next following rib D' of the roller D. A pin F in the forward end of the jaw B engages an elongated slot $E^2$, formed in the cover E, to prevent the latter from turning in the jaw B and to allow free longitudinal movement thereof relatively to the roller D.

When the cloth extends between the jaws A and B and between the roller D and its cover E, then the ribs E' press on the top of the cloth, so as to press the latter down between adjacent ribs D' of the rollers D, and when a pull is exerted on the cloth in a lateral direction, then the cover E with its ribs E' tightly holds the cloth against the ribs D' to prevent such movement of the cloth. When a longitudinal pull is exerted on the cloth it readily passes through the temple, as the cloth in its longitudinal movement will turn the roller D, owing to the impact of the cloth on the teeth of the ribs D', and a binding action of the cover is completely prevented.

When a transverse pull comes on the cloth, the cover will adjust itself as close to the ribs of the roll as the angle formed at the bends of the cloth will permit—that is, the angle of the cloth between the ribs of the roll and cover, where the angles at the bends of the cloth are obtuse; but they cannot come quite in contact, for if the angle in front of the ribs became more acute than the angle behind, the tendency would then be more to force them apart longitudinally of the roller D than to draw them together irrespective of the strength of the pull. The reason for this is because the teeth are on the roll and not on the cover, so that when the pull comes on the cloth the pull is on the roll to the same degree. It is evident that when the pull on the cloth is in the direction of the arrow *o*, Fig. 5, then the cover can readily slide in the direction of the arrow to quite a distance without its ribs E' coming in contact with the ribs D' of the roll D. As the cover moves in the direction indicated the angle of the cloth between adjacent ribs D' becomes acute relative to the said ribs D' and prevents the ribs E' and D' from positively clamping the cloth between the same, but presses the cloth sufficiently to prevent it from slipping in the direction indicated, but allows the cloth to move longitudinally or at right angles to the axis of the roll D when the cloth is wound up on the cloth roll or otherwise moved forward.

The function of the cover ribs is mainly to press the cloth firmly between the ribs D' and the roll D to hold the cloth in firm contact with the fine teeth thereof, so that the roll readily turns on moving the cloth forward. By this arrangement the cloth can be readily pulled through the temple in a longitudinal direction without injury to its selvage or side threads, but transverse movement is completely prevented, as the cloth is securely gripped and held between the ribs of the rollers D and the cover E. Thus when the lay beats up the filling, the cloth is securely held in a properly stretched position, so that the filling can easily pass to its position and be beaten in by the lay without producing a slack in the cloth. *(Patrick Duffy and James F. Powers, New Bedford, Mass.)*

## WILLEMAIN'S TEMPLE.

The object aimed at in its construction is to produce a temple which can be used on delicate fabrics without injuring it.

Figs. 1 and 2 are two different sectional views of this temple and Fig. 3 is a perspective view of the cam plate.

A represents an annular case having an arm B for securing it to the loom in a proper position, said arm lying in a plane below the top of said case A to give free passage to the fabric C across the top of said case. A lug A' extends outward from the side of the case A at right angles to arm B. Ring D receives the parts of the temple coacting with those parts contained in the case A and is bolted to lug A' by bolt 2, being provided with a lug B', similar to the lug A', for that purpose. The bolt 2 passes through both lugs and is provided with a head 3, countersunk in the

under side of the lug A′ and with a nut 4, bearing on the upper surface of the lug B′. The upper end of bolt 2 is slotted transversely, whereby it may be turned with a screw driver when the nut 4 is loosened, and the head 3 of the bolt is provided with a pin 5, located near the edge of said head. Lugs A′ and B′ are so constructed that when they are bolted together the contiguous edges of the ring D and the case A will be separated by the space *a*, through which the fabric C passes.

In the lowest part of case A is a circular cam plate 6, provided with groove 7, the two diameters of the cam plate forming a shoulder 8. The base of the groove 7 is inclined upward as at 9 over which is cut a slot 10 projecting over said incline. On the edge of the cam plate is a tongue 12 extending through a slot in the case A and by which means the incline 9 may be swung at right angles to the line of movement of the fabric. The case A is provided with a central boss *b* which fits the center of the cam plate, permitting rotation of the same, with its edges free from the sides of case A.

A circular plunger plate 13 fits the case A on top of the cam plate 6 and is provided with a row of holes 14, extending through at right angles to the plane of rotation of said plate, and coincides with the center of slot 10. The holes 14 receive the plungers 15 provided with heads which bear on the cam plate 6, around which, when put in place, a number of steel balls 16 are inserted through the slot 10, and the plunger plate

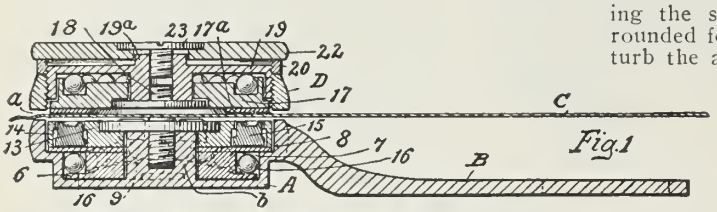


Fig.1

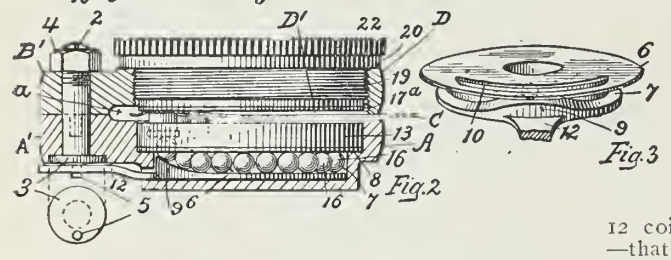


Fig.2



Fig.3

13, having the plungers 15 thereon, is then laid in said case on the top of said cam plate 6. When the balls 16 are placed in the groove 7, those that rest on the upwardly inclined part 9 of said groove will project through the slot of the tongue 12 and above the surface of the said cam plate 6 and therefore when the plunger plate is placed in position on said cam plate the plungers 15, lying over said slot, will be forced upward, so that their upper ends will project above the upper surface of the plunger plate 13 to practically the same extent that the balls 16 project above the surface of the plate 6.

As the walls between the holes 14 in the plunger plate have been cut away, by the groove in the plunger plate 13, which groove has a depth somewhat in excess of the distance which the balls 16 project above the cam plate 6, it follows that said plunger plate may be rotated without hindrance and that when said plate is so rotated the bases of the plungers 15 are successively caused to ride up on the balls lying on the incline 9, thus forcing the upper ends of said plungers outward above the surface of said plunger plate. The upper ends of these plungers 15 as they are forced upward impinge when near the summit of the incline 9 against the surface of a circular plate 17, supported to rotate freely in the ring D, and said plate is concentric with and parallel with the contiguous face of the plunger plate 13. A rubber ring 17a, is applied to said plate 17 and covers that part of it extending from the edge thereof inward for a distance a little greater than the diameter of the plungers 15. Said circular plate 17 is held in proper position by screws 18, entering the hub of a shell 19, which is screw threaded to enter the threaded interior of the ring D, and said shell is made to project far enough out of said ring to permit of locating a check nut 20 thereon, the position of which will determine the distance between the faces of said circular plate 17 and said plunger plate 13.

To obviate the possibility of disturbing the adjustment of the check nut 20, a part 19a of the hub of the shell 19 on the outside of said shell is made square and a plate 22, having a slightly larger diameter than said check nut, has a square perforation through it which fits over the square end 19a of the hub of the shell 19, and after said check nut 20 has been set, the said plate 22 is placed in position and fixed there, as shown in Fig. 1, by a screw 23, and the shell 19 can then be screwed into or out of said ring D by grasping the said plate 22, whose edge is knurled and rounded for the purpose, without being liable to disturb the adjustment of the check nut 20. The edge of the ring D is made to extend somewhat below the surface of the plate 17, as at D′, to prevent contact between the face of plate 17 and the fabric, which when gripped between the two plates can be drawn freely through the temple, but any attempt to draw the fabric transversely to said direction is impossible.

The fabric is gripped before the plunger arrives at the highest point of the incline 9, and this grip is maintained on the fabric for an equal distance each side of a line drawn through the center of the temple and through the bolt 2 if the center of the slot in the tongue 12 coincides with the above mentioned center line —that is to say, said fabric is gripped at a point on one side of said line equidistant from said line with the point on the other side at which said grip is released. Thus by moving said tongue 12 right or left the point of gripping engagement of said fabric may be varied relative to the point of release, and thus more or less transverse draft may be given to the temple, as may be desired.

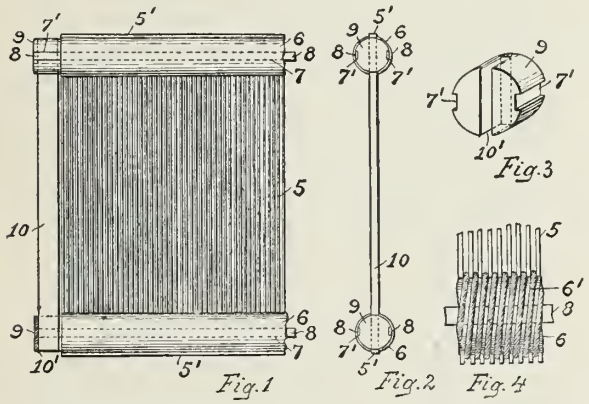
A thin rubber ring, similar to the ring 17a of the plate 17 is provided; this ring has short projections adapted to enter depressions in the tops of the plungers 15 when said ring is placed on the plunger plate in a position opposite the ring 17a on plate 17. The purpose of this ring is to protect a very thin material from being injured by the ends of the plungers being forced against it. In case of weaving extra heavy fabrics, more than one row of plungers 15 may be employed. *(Louis Willemain, Westfield, Mass.)*

# REEDS, HEDDLES, HARNESSES AND SUPPLIES.

## THE EXCELSIOR REED.

Fig. 1 is a side view of part of this reed. Fig. 2 is an end view of the same. Fig. 3 is a perspective view of one of the end pieces by which the end bars are secured to the ends of the ribs. Fig. 4 shows the method of securing the ribs, the dents, and the metallic strips together.

5 indicates the series of dents, and 6 the upper and lower ribs, made of two semi cylindrical halves. The dents 5, near their ends, are placed between the two halves of the ribs 6. They are each provided with a longitudinal groove 7, in which is embedded a metallic strip 8. The ribs 6, with the longitudinal strips 8, are secured to the dents by twine wound spirally around the two halves of the ribs 6, over the longitudinal strips 8, and between the dents. The projecting ends of the dents 5′ are covered with solder. Heretofore the ribs 6 were made to extend beyond the dents, so as to receive the end bars 10 between them, and were secured to the end bars 10 by winding twine around the ends of the ribs and passing the twine through holes in the end bars 10. These twines



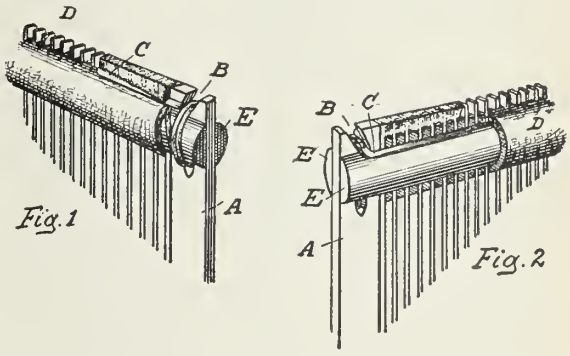

were soon worn by the constant use of the reed and the end bars loosened.

In the new reed the metallic strips 8 are secured in the grooves 7 of the ribs 6 by the twine 6′, which is wound spirally around the two halves of the ribs 6, over the metallic strips 8 and between the dents 5. The ends of the longitudinal strips 8 extend beyond the ends of the ribs 6, and after securing the end bar 10 in the slots 10′ of the metallic end block 9 by solder, one of the end bars 10, provided with one of the metallized blocks 9 is placed at each end, so that the projecting ends of the metallic strips 8 will enter the grooves 7′ of the end blocks 9 and bring the end blocks up close to the ribs 6, and then secure the strips 8 to the metallic blocks 9 by solder, whereby the metallic blocks 9 firmly secure the end bars 10 and thus materially strengthen the ends of the reed. *(Excelsior Loom Reed Works, Pawtucket, R. I.)*

## WOOD'S REED.

In this reed means are provided for securely holding the end bars in position.

Fig. 1 is a detail perspective view of one end of this reed. Fig. 2 is a similar view of the reverse side of the reed.




A designates the end bars of the reed, which are provided at their respective ends with the inclined slots B, the slots of the opposite bars being reversely inclined. C are the wires or cords, one wire or cord being placed at each longitudinal edge of the reed with one of its ends soldered thereto, as illustrated by Fig. 1. The wire or cord is then passed through the inclined slot of the bar and then along the reed beneath the band D thereof to the opposite bar, where it is passed through the inclined slot thereof, with its end soldered to the opposite side of the reed at that end. The side bar E of the reed is formed to receive said wire. *(Byron Wood, Danielson, Conn.)*

## REED FOR PRODUCING FIGURED EFFECTS.

In this reed the wires are pivoted at one end to the framing of the reed, and adapted to swing at the upper end thereof, in the direction of the plane thereof, between the side walls of the framing of the reed, the dents being properly spaced apart at the lower ends by a coiled spring, each convolution of which projects between two of the reed wires. In addition to the coiled spacing spring, side bars are employed between the spring and the edges of the dents of the reed. The reed wires are spaced apart at the upper ends thereof by spacing strips, each of which projects between two of the reed wires, the spacing strips in themselves forming a reed like construction which separates the upper dents in the reed proper.

A pattern cylinder is mounted interchangeable on the batten of the loom, said pattern cylinder having the design to be produced on the cloth engraved on its surface and is arranged to revolve slowly during the operation of the loom, thus regulates, *i. e.*, moves forwards or backwards such dents of the reed as required for forming the pattern in the cloth, which in this case is produced by the filling, in place of running straight across the loom from selvage to selvage as in regular weaving, following the contour of the reed, and which contour is thus continually determined by the pattern cylinder. After each pick, said pattern cylinder automatically slightly revolves, presenting a different part of its pattern. Inserting fill-

ing and motion of pattern cylinder continues until repeat of pattern is obtained and so right along over and over again. *(Jacob Walder, Paterson, N. J.)*

## REED PLIERS.

The object is to provide a strong, simple and efficient tool for drawing back into place and straightening imperfect reed wires.

Fig. 1 is a side view illustrating the manner in which this plier is used for straightening the wires of a reed. Fig. 2 is an enlarged view with one of the side plates removed, and Fig. 3 is a similar view showing the parts in a different relative position.

The body portion of the plier is formed by side plates 10, having a recess or opening 11, and their front ends formed to receive the side bar of a loom reed A, as illustrated in Fig. 1. Pivotally mounted in the side plates 10 are operating handles 12. Threaded into one of the operating handles 12 is a set screw 14. 18 represents movable jaws made of hardened steel. The retracting connections comprise the toggle links 15, which connect the operating handles 12 to a link 16 which in turn is provided at its end with a **T**-shaped head 9 for engaging notches in the movable jaws 18. Springs 17 are secured to the operating handles 12 and engage the link 16 to normally keep the handles 12 open. The fulcrum plates 19 are pivotally mounted in the side plates 10 and can be adjusted to vary the width of the opening between the movable jaws 18 by means of screws 20, tapped

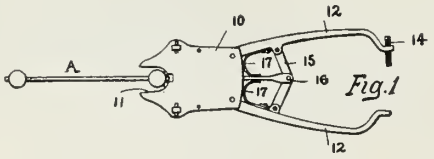


Fig. 1

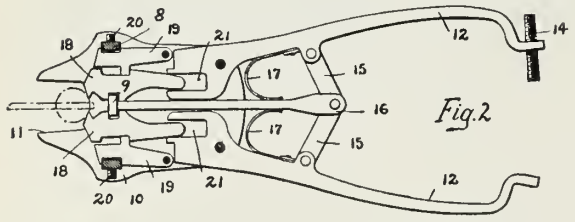


Fig. 2

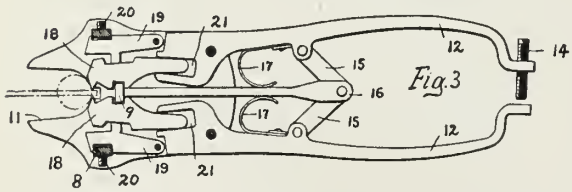


Fig. 3

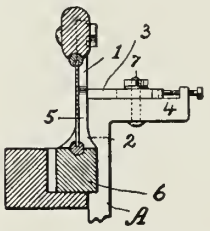
into removable pieces or keys 8. The tailpieces of the jaws 18 are arranged to engage notches 21 in the ends of the operating handles 12.

By means of this construction it will be seen that when the operating handles 12 are moved toward each other, as illustrated in Fig. 3, the jaws 18 may be closed upon the wires of a reed and the toggle retracting connections will exert a heavy tension or pull on said reed wires, so that the wires will be efficiently straightened and brought back to proper position. The stroke of the movable jaws 18 or the distance which the same can be retracted can be adjusted by means of the set screw 14. *(Leanderi Autio, Fitchburg, Mass.)*

## DEVICE FOR ADJUSTING REED AND BOX PLATE.

The object is to provide means for adjusting the box plate on the lay, so that the backs of the shuttle boxes will always be in alignment, the reed being connected to the box plate, both of which are thus adjusted in unison.

The illustration is a transverse sectional view of the device, showing one side of the lay.




As is usual, the lay swords A project above the lay, at the rear side thereof, and the end stands 1 rest against them, the inner upright edges of the stands being enlarged to form integral shoulders 2, which abut against the inner sides of the lay swords. Each stand 1 is provided with an integral rearwardly extended ear 3, which rests on the bent over top 4 of the adjacent lay sword and is adjustably secured thereto by a clamping bolt 7, extended through the top of the sword and through a slot in the ear.

The adjustment of the box plates 5 is effected by loosening the bolts 7 and moving the stands forward or back, as may be necessary, and as the box plates are rigidly connected by the end stands and girth 6 they must always be in absolute alignment. It is thus impossible to leave one of the box plates projecting out of line with the other or with the reed, so that there is no tendency to deflect the shuttle from its proper path as it is shot across the lay. *(Timothy Mooney and Clement Renaud, Fall River, Mass.)*

## PATERSON'S DOUP HEDDLE.

The object is to produce a very fine wire doup, yet strong enough to stand the wear it is subjected to during weaving.

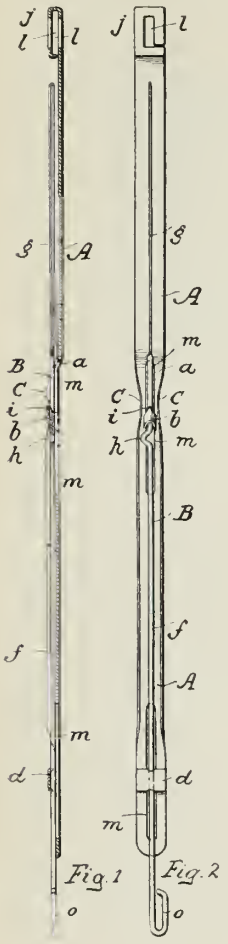
Fig. 1 is a longitudinal vertical sectional view of a heddle strip and its doup needle, and Fig. 2 is a plan view of the same.

A indicates a flat strip of metal bent over at its end into a loop *j*, forming an opening *l* for attaching this heddle strip to the bar of the harness frame. This heddle strip A is bent slightly in the middle as at *a*, and is provided below this bend with a guide eye *b* in which the wire doup *g*, as well as that part of the doup needle B as extending above the bend *h*, slides. The sides of the heddle strip adjacent the eye *b* are bent forward to provide thread guiding wings C which guide the standard thread over the outside of the eye *b* during weaving. Near its lower end the heddle strip A is provided with a guide eye *d* (formed by bending the heddle strip) for holding the lower end of the doup needle in position.

The doup needle consists of a shank *f* to which is attached the doup *g*, made of fine steel wire, the shank *f* being also provided with a bend *h* which limits the drop of the doup needle, said bend abutting against the guide *d* of the heddle strip.

On account of the doup *g* (especially its eye) being very easily bent, the heddle strip is provided with a thread guard *i* (shown as a point on the eye *b*) which

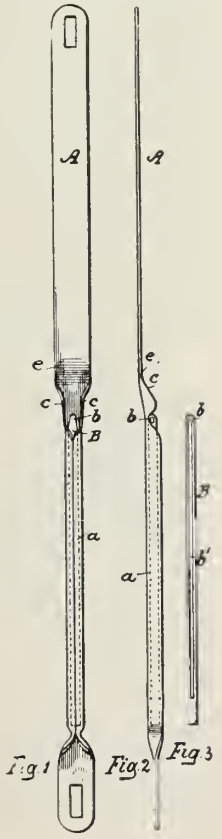
catches the doup thread when douping, thus preventing any lateral strain to the eye of the doup, at the same time not interfering, or catching, with the standard warp threads.




The heddle strip A is provided with the two slots *m*, one near the eye *b*, the other near the eye *d*, to permit the removal of the doup needle which for this purpose is moved downward until the bend *h* reaches the upper portion of the slot *m*, then the doup needle is turned to bring the bend *h* into the slot *m*, thus permitting ready withdrawal of the doup needle from its heddle strip.

For the purpose of threading the doup needle to its heddle strip the procedure, previously explained, is reversed.

The arrangement of the heddle strips and doup needles to be lifted by the bar of the harness frame, and the doup needles to be returned by gravity as explained, may be reversed, (if required by the fabric woven) and in which case the heddle strip and its doup needle are turned about or reversed, the doup needle B being connected with the bar of the harness frame. For this purpose the ends of the doup needles B are extended beyond the ends of the heddle strips A and are provided with loops or eyes *o*. *(James B. Paterson, Philadelphia, Pa.)*

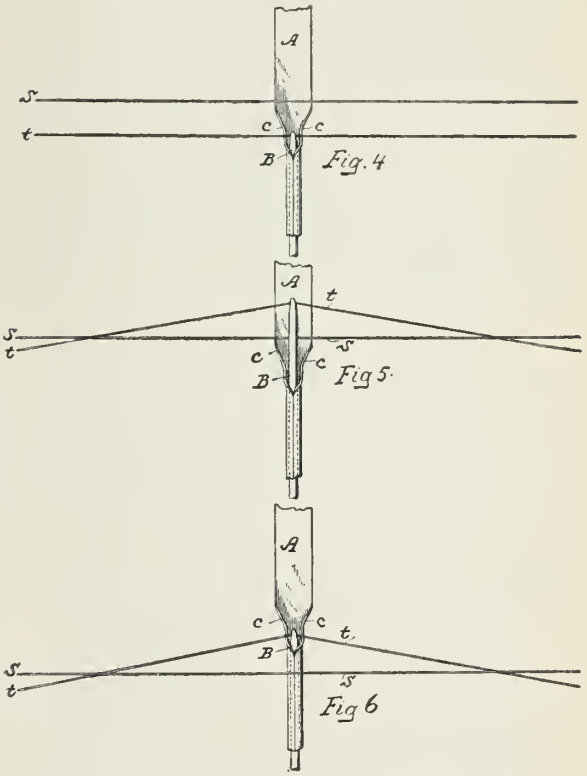



## WHARTON'S DOUP HEDDLE.

The mechanism consists in combining a heddle strip or member with a doup needle which controls one or more doup threads so constructed and operated that during the formation of the sheds the doup needle warps and free warps are crossed.

Fig. 1 is a front view of the doup heddle, Fig. 2 a side view of the same, Fig. 3 a modification of the doup needle, and Figs. 4, 5 and 6 are diagrams illustrating the operation of the doup heddle strips in crossing the warps.

A is the heddle strip or member, composed of a thin continuous strip of metal, or a longitudinally slotted




strip or of wire. B is the doup needle, which is supported by the heddle strip or member A and guided upon it. The doup needle extends up to about the middle of the heddle strip A and is provided on its end with an eye *b*, through which the warp thread passes.

The doup needle consists of a round needle, guided in a longitudinal socket *a* on the heddle strip, formed by bending the metal of which the strip is composed. The heddle strip A, immediately above the eye of the doup needle when in its lowest position, is provided with a projection, guide, or extension *c*, made by swaging up the sides of the metal strip A on each side immediately above the eye of the needle, so as to form two projecting wings or extensions, between which the doup needle moves when it rises and falls. These guides *c* serve to guide the warp thread which is not operated by the doup needle over the needle and doup needle thread when the heddle strip A is lifted. This operation will be readily understood from Figs. 4, 5 and 6, in which *s* and *t* are respectively the free warp and doup needle warp. What is meant by the "free" warp is merely the free warp so far as this particular heddle member is concerned. That warp may be the doup needle warp of another heddle, just as the doup needle warp of this particular heddle may be the free warp of another heddle.

When the heddle and doup needle are at rest, as in Fig. 4, the free warp *s* lies above the eye *b* of the doup needle. When now the doup needle thread is lifted, the needle B is lifted also and passes above and outside of the free warp *s*, as shown in Fig. 5. To permit the doup needle to pass outside of the

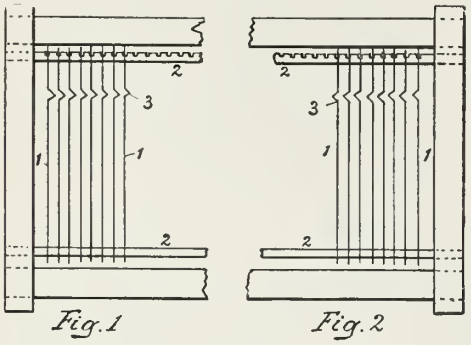
warp *s*, the heddle strip or member is bent back slightly above the guides *c*, as at *c'*, so that the warp *s* will lie inside of the line of movement of doup needle. When the warp *t* is released, the doup needle falls back into its former position, carrying the warp *t* with it. The lowering of the doup needles is done by gravity. When now the heddle strip or member A is lifted, the doup needle and warp *t* are lifted also and pass above the free warp *s*; but as the heddle strip rises, the guides *c* acting on the warp *s*, push it outward outside of the needle B, which passes behind the thread *t*, so that the thread *s* is crossed outside of the thread *t*, as shown in Fig. 6.

The doup needle may be provided with a longitudinal slot *b'*, as shown in Fig. 3, forming an elongated eye adapted to receive two or more doup needle threads which may be successively operated, thus producing variations in the cross weaving. *(Richard Wharton, Philadelphia, Pa.)*

## SHINN'S SWITCH HEDDLE.

The object of this heddle, is to switch and guide one warp thread over another warp thread in weaving gauze fabrics, chenille, and other cross woven fabrics.

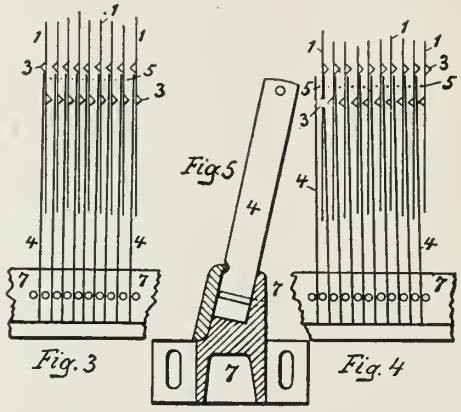
Figs. 1 and 2 are front sectional elevations of two heddle frames, which work in unison. Figs. 3 and 4 show a series of switch heddles, needles, and a section of the needle supporting bar. Fig. 5 is a face view of one of the needles and a sectional end view of the needle supporting bar.




1 represents the switch heddle, made of cold rolled flat strips of steel or iron, No. 26 wire gauge, three eighths of an inch wide and about 12 inches long. At each end are punched holes for the stringing bars 2. In this flat strip is "swaged" the full width, a projecting cam 3. The projecting distance of the cam 3 is governed by the number of switch heddles to be used in the inch space. This cam is placed near one end, say about 2 inches from the end. These switch heddles are strung on the bars 2 in the heddle frames, which frames are of ordinary construction except the stringing bars 2, which are round, the top one being spaced with shallow notches.

In mounting the switch heddles, Fig. 1, the cams all project to the right, those in Fig. 2 to the left hand. 4 represents the needle, made of strips of spring steel, about No. 23 wire gauge thick, three fourths of an inch wide and about ten inches long. These needles are set in a supporting bar 7, which bar is divided by pins, as shown in Figs. 3 and 4, to receive the number of needles used per inch. This needle bar is fixed in the loom, so as to bring the points of the needles betweeen each pair of switch heddles, as shown in Figs. 3 and 4.

Fig. 1 is supposed to be the front heddle frame and Fig. 2 the second heddle frame. The third or back heddle frame in the loom (not shown) carries ordinary "wire heddles" and operates the crossing warp-thread. These heddle frames can be operated by the ordinary treadles or cams or may be operated by a pattern chain controlled heddle motion. In order to




have the switch heddle work well, the same should be given an up and down movement of about one half of an inch and work one pick up and one pick down alternately.

The third or back heddle frame carries the crossing warp thread 5 and works up and down every pick.

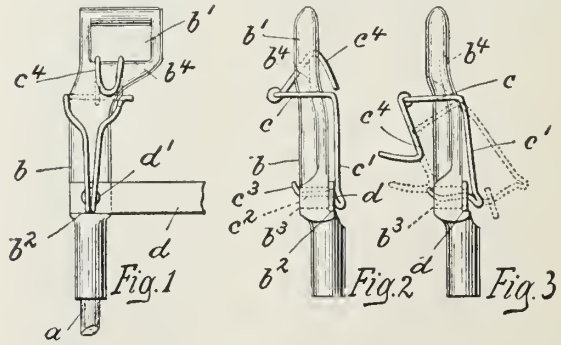
Referring to Fig. 3, the front heddle is down. The cams 3 of these heddles push the needles to the right and under the cams above, which opens a passage for the crossing warp thread 5 on the left of the needle. Fig. 4 represents the second heddle as down. This pushes the needles to the left and the thread 5 is switched and guided to the right hand side of the needle.

The switch heddle with its needle 4, can be used also as a "selvage motion" to cross weave a selvage where two breadths of the cloth are woven in one loom and a selvage is desired at the point of separation. *(John Shinn, Philadelphia, Pa.)*

## CLAMP FOR HEDDLE BARS FOR NORTHROP LOOMS.

The object is to produce a clamp for the heddle bars which cannot work loose by the jarring of the loom, and which can be instantly locked or unlocked by the use of the fingers only.

Fig. 1 is an enlarged view of the upper end of one of the side bars with the clamp in locked position. Fig. 2 is a left hand end elevation thereof. Fig. 3 is




a like view, but with the locking latch released to permit removal of the heddle bar.

The side bars *a* of the harness frame are provided at their upper ends with extensions *b*, forming stirrups *b'* at their tops for the overhead connections. Each extension is flattened on its front face and pro-

vided with a transverse shoulder $b^2$ to form a supporting seat for the transverse heddle bar $d$, the latter passing through elongated slots in the heddles or detectors.

The heddle bar has holes $d'$ therein near its ends, which register with apertures $b^3$ in the extensions $b$ adjacent and just above the stirrups $b'$, the heddle bar resting on its lower edge on the said stirrups.

Each side bar $a$ is provided with a clamp to retain the heddle bar $d$ in place, the clamp being made of stout spring wire, bent to form an open body portion $c$, which loosely embraces the extension $b$. The ends of the wire are then brought together and bent down at $c'$, and then bent rearwardly to form a retaining tongue $c^2$, having an upturned tip $c^3$. The tongue is adapted to enter the hole of the heddle bar and the aperture in the extension $b$, the tip of the tongue resting against the back of the extension, as shown in Fig. 2, when the clamp is locked.

A hook shaped latch $c^4$ is pivotally mounted on the body, the curved end of the latch entering the opening of the stirrup $b'$ and engaging its edge $b^4$ nearest the heddle bar and acting to draw the tongue tightly into place, Fig. 2, while the shape of the latch prevents its release by accident.

To release the clamp, the attendant pushes the latch $c^4$ out of operative position, as in Fig. 3, and thereupon the depending part $c'$ of the body can be moved into dotted line position Fig. 3, withdrawing the tongue $c^2$ from the aperture $b^3$, so that the heddle bar can be lifted from the tongue. *(Draper Co.)*

## A ROTATING LEASE ROD.

This construction refers to that lease rod as situated nearest to the whip roll in a loom, and consists in the oval shape of said rod as well as in the providing of means for rotating said rod automatically during the running of the loom, thus greatly assisting in the separation of warp threads stuck together by reason of the sizing or interlocking of fibres or knots in the thread. At the same time means are adapted to render the rod quickly and easily mounted and dismounted from its supports.

Fig. 1 is a perspective view of so much of a loom

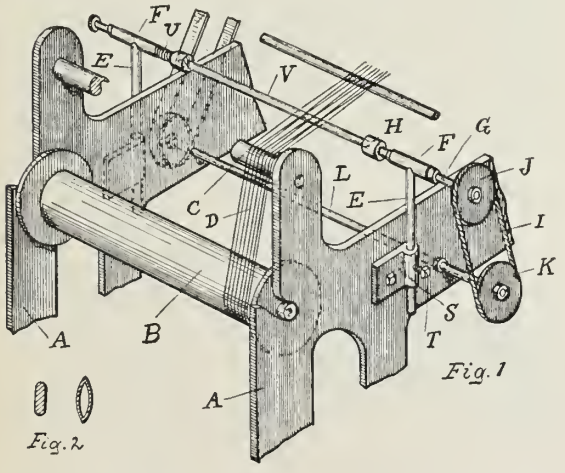



Fig. 1



Fig. 2

as necessary to show the application of this lease rod thereto. Fig. 2 shows in section, two specimens of the oval shape of said lease rod, *i. e.*, showing that the rods have unequal diameters.

A represents the frame of a loom, B the beam, C the whip roll, and D the warp. Standards E, having horizontal bearings F at the top, are secured to either side of the loom frames A. Mounted in said horizontal bearings F are shafts G, having on the ends thereof socketed holders H, adapted to receive and support the ends of the lease rod V. The rotating of this rod is accomplished by belt I, passing over pulley J on shaft G and a pulley K on shaft L.

For the purpose of quickly and easily inserting and removing the lease rod from the warp, one of the supporting shafts is made capable of longitudinal movement sufficient to release the end of the rod from the socket in the holder by means of a coil spring U, interposed between the bearing F and the head H of the rotary shaft G which supports the rod V. The supports which carry the rotatable holders can be adjusted vertically by moving the standards up or down in tubular brackets S, secured to the sides of the frame, and may be held in any desired position by set screws T, thus increasing or diminishing the tension on the warp. *(Harold Kelly, Biddeford, and John P. Kelly, Saco, Maine.)*

## MOVABLE LEASE ROD.

The object of this lease rod is to prevent the breaking of the threads at their point of separation by the lease rods, the adjacent warp threads sticking frequently together by sizing or by interlocking of fibres, or by projections or knots in the threads.

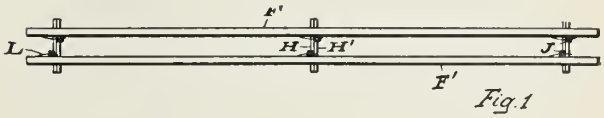



Fig. 1

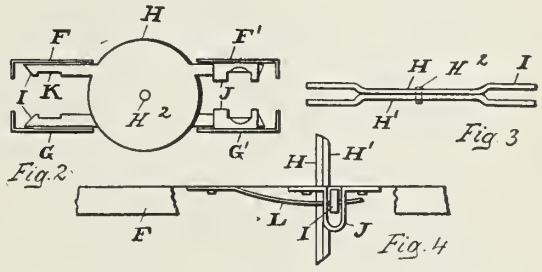



Fig. 2 Fig. 3 Fig. 4

Fig. 1 is a plan view of the lease rod. Fig. 2 is an end elevation of the same. Fig. 3 is an edge view of the pivotally connected supports with their projecting tongues, on which are mounted the bars which form the rod; and Fig. 4 is a side elevation, with parts broken out, showing a means of securing the bars to the tongues of the supports.

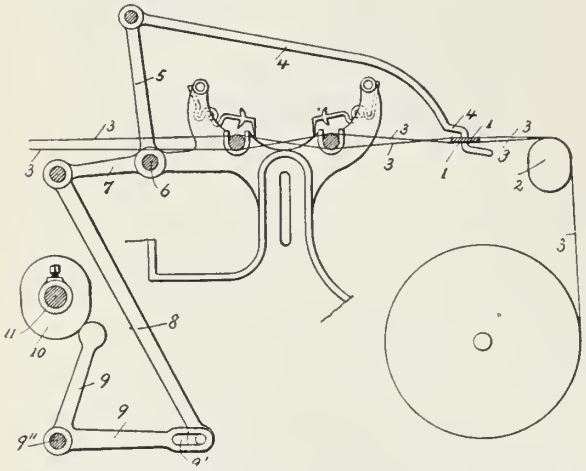
The lease rod consists of two pairs of bars, viz., the upper pair of bars F F′ and the lower pair of bars G G′. These bars are mounted on supports H H′ F F′ on H and G G′ on H′ the supports H H′ lying side by side and connected by a pivot bar $H^2$, extending transversely through supports H H′, bars F F′ being some distance vertically from bars G G′. Projecting tongues I, are provided, being integral with the body parts of the supports, extending in opposite directions and on the same side of the pivot point, and adapted to enter loops or staples J in the under sides of the bars. To insure their not being accidentally displaced, small recesses K are made in the tongues I and secure to the bars, springs L, adapted to engage said recesses in said tongues and prevent them from being withdrawn from the loops or staples, and yet at the same time by lifting the springs allowing the bars to be freely removed from the connecting links, which is necessary in inserting and removing the lease rods.

When the shed is open, the tension of the warp threads on the side of the lease rod nearest the whip roll is sufficient to force the bars on that side of the lease rod together, but when the shed closes, the tension on the harness side becomes greater than the tension on the other side, and consequently the bars on the harness side of the lease rod are forced together, thus causing the bars on the opposite side to separate, thus separating the alternate threads at the point when they separate to receive the rods by a more gradual force than would be the case if they were drawn against an ordinary lease rod. The rocking of the lease rod is continuous and regular, being caused by the harnesses in the operation of shedding. *(Frank L. Hammond, Biddeford, Maine.)*

## DEVICE TO PREVENT WARP THREADS FROM ADHERING.

This device is used in connection with warp stop motions and has for its object to prevent this trouble, the device consisting in a movable rod placed between the stop motion and the back roll. Said rod has alternate warp threads pass above and below it. A back and forth motion is given to said rod at intervals, which motion separates adhering warp threads from each other, which then pass to the detectors comparatively free one from another.

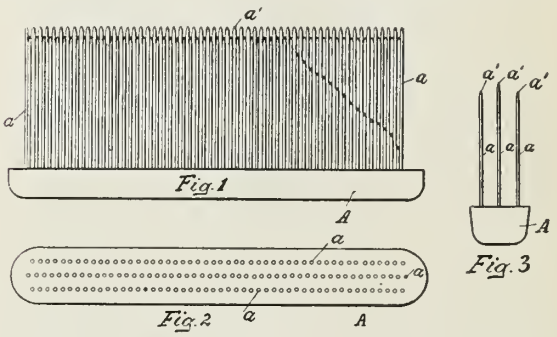
In the illustration the device is shown in connection with that portion of a warp stop motion as necessary to explain its operation. The movable rod 1 is located between the back roll 2, and the warp stop motion mechanism and extends transversely across the warp threads 3, which pass above and below it alternately. A back and forth motion is automatically given at intervals to the rod 1 thus:—Each end of the rod 1 is connected by a rod 4 to an arm or lever 5, fast on a rock shaft 6. A rocking motion is given to the rock shaft 6 through an arm 7, fast thereon, and a link 8, connected with said arm and



also with the slotted end 9′ of one arm of the angle lever 9, pivoted at 9″. The other arm of said angle lever 9 engages a cam 10 on a driven shaft 11. The revolution of the cam 10, through angle lever 9, link 8, arm 7, lever 5, rod 4, communicates a back and forth motion to rod 1 and causes it to separate adhering warp threads from each other. *(Crompton and Knowles Loom Works.)*

## OGDEN'S PICK OUT COMB.

Fig. 1 is a side view, Fig. 2 a plan view of the side having the teeth, and Fig. 3 an end view of this comb. A indicates the back or base portion of the comb, from which the teeth project. Three rows of teeth *a* are provided, arranged in longitudinal and parallel position, and the outer ends *a′* or points of the middle row of pins project a slight distance beyond the ends or points of the pins of the outer or side rows, the ends or points of the pins of said outer or side rows being on a corresponding plane with relation to each other. The extent of projection of the points of the pins of the middle row beyond the points of the pins of the side rows is about one twentieth of an inch. When scratching up or picking out with this comb, it is held so that the points of two of the rows



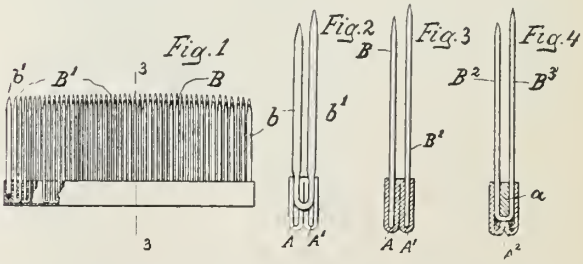

of pins will bear upon the cloth, thus accomplishing about a double quantity of work at each stroke of the hand, compared to common combs. Three rows of pins are inserted in the comb (although two rows only can be used), in order to permit ready use of said comb no matter in which position the operator takes hold of it. *(Washington Ogden, Fall River, Mass.)*

## CARR'S PICK OUT COMB.

Fig. 1 is an elevation, partly in section, of the comb, Fig. 2 an end view, and Fig. 3 a section on line 3-3 of Fig. 1. Fig. 4 is a section of such a comb showing a modification in its construction.

The teeth of the comb are formed in pairs, by bending a single piece of wire, which pairs are firmly secured in sets as B or B′, in trough shaped backs A or A′ as in Figs. 1, 2, and 3, or so that each tooth in one set, as $B^2$, shall be integral with the corresponding tooth of the other set $B^3$ as shown in Fig. 4, where the strip *a* is separate from the back $A^2$ but when in place forms part of the back and reduces the quantity of solder which would be necessary if the strip *a* was not used.

The two backs A and A′ are held from spreading by two pairs of special end teeth *b b′*, one at each end of the comb, the pairs being formed of a single piece of wire bent near its middle, but placed in the comb with one tooth of each pair in trough A and the




other tooth in trough A′. These end teeth *b b′* are made of heavier wire than the intermediate teeth B B′, thus making the comb strong and durable, the teeth being held in such a manner that they cannot work loose. *(James A. Carr, Fall River, Mass.)*

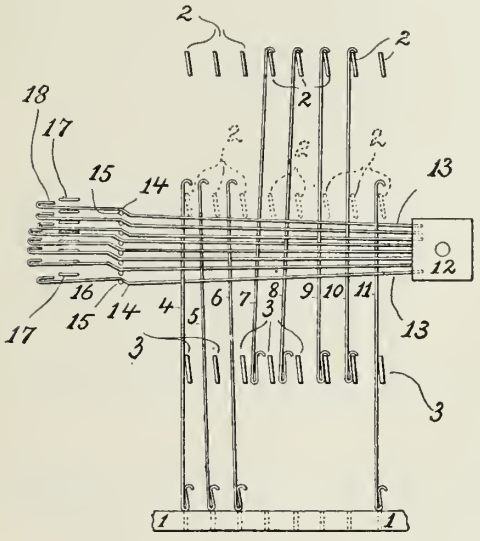
# JACQUARDS AND CARD CUTTING MACHINERY.

## THE KNOWLES FULL OPEN SHED JACQUARD.

The object is to form an open shed by means of only one beat of the cylinder for each pick or card.

The illustration is a vertical section of the working plan of this machine.

1 indicates the bottom board. 2 the bars of the raising and falling griff, shown in full lines at their highest point, and in dotted at their lowest point, *i. e.*,




when at rest. 3 are the bars of the stationary griff of the machine. 4, 5, 6, 7, 8, 9, 10 and 11 are the hooks of an eight row Jacquard machine shown in various positions in order to explain their method of working. 12 is the card cylinder or prism, which, by means of holes or no holes cut in the cards, operates needles 13.

These needles 13 are of a new and peculiar shape, having a short bend 14, sliding up or down (as regulated by hole or no hole for respective needle in card) on pins 15, in turn either raising or lowering their rear portion 16, bringing them (their respective hooked or projecting part) either in contact or out of contact of the knives 17 of a horizontal back and forth moving griff. In the illustration the three top needles and the bottom needle are shown for holes cut in card, thus their hooks or projections in the rear end of the needles are out of reach of the knives 17; the other needles being shown operated the opposite, hence hook or projecting parts in the rear end of needles are in line for being acted on by knives 17.

After a card has indicated which of the hooks are to rise, the moving griff starts on its upward journey, the cylinder at the same time moves outward, turns, and returns to the needle board with the next card for action, at the same time the raising griff reaches its highest point, followed by a slight outward movement of the horizontally moving griff and its knives 17, which movement is sufficient to place the knives of this griff in engagement with the hooks or projections 18 on those needles 13 which have been uplifted in consequence of the action of their bent portions 14 upon the rods 15.

As this griff containing the knives 17 moves outward, it carries with it all those needles with which it thus came in contact, thus drawing the bottom crooks of the respective hooks back and out of contact with the stationary griff bars 3, allowing them to be lowered on the downward movement of the griff bars 2 as is shown by hooks 7 and 8 in the illustration.

By means of the stationary griff for keeping the top shed in position with the attachment in the rear for disengaging the bottom crooks of the hooks from the stationary griff 3, when they have to be lowered in the process of weaving, a full open shed is maintained with one beat of the cylinder for every card and pick. *(Crompton and Knowles Loom Works.)*

## THE CROMPTON AND KNOWLES DOUBLE ACTION JACQUARD MACHINE.

The object is to prevent engagement of a descending hook by the ascending griff which obviates the necessity of making a second or extra beat of the card cylinder for the same purpose, thus permitting a great increase in speed. When it is undertaken to prevent improper engagement of a descending hook by the ascending griff at the time when the two griffs are passing each other by causing an additional movement of the card cylinder to present again to the needles the same card which was last presented thereto, a slowing down of the operation of the loom below the speed that otherwise would be attainable is necessitated, since such additional movement of the card cylinder renders it necessary to occasion two complete beats or movements of the cylinder for each pick.

Fig. 1 shows in side elevation certain portions of a double action Jacquard machine having one embodiment of the mechanism applied thereto. Fig. 2 is a view in transverse vertical section of the parts which are represented in Fig. 1. Fig. 3 is a view in vertical section corresponding with a part of Fig. 2, but showing a modification.

1 indicates the frame, 2 the bottom board, 3 the hooks, 4 the needles coöperating therewith, 5 the springs and 6 the card cylinder; 7 and 8 respectively designate the two moving griff frames, mounted, respectively, on the slide rods 9 and 10, fitted to move in guides 11 on the fixed framework of the machine.

The hooks 3 are each provided with two crooks 31, for engagement with the respective moving griffs, the said hooks 3, being double, as shown, each limb of each hook having a crook 31, one of which is designed for coöperation with a griff blade 27, and the other for coöperation with the adjacent griff blade 22, one of such griff blades being designed to be uplifted for one shed and the other for the succeeding shed.

12 designates the blades of a stationary griff such as sometimes is employed (that is to say, in full open shed Jacquard machines) when it is desired that an upraised hook shall remain in its elevated position for several picks in succession without being caused to descend meanwhile. 29 designates crooks formed on the hooks 3 for engagement with the said griff blades 12.

In this Jacquard, means are provided whereby as

each of the moving griffs in turn descends the disengaged crooks 31 of the hooks which are engaged and descending therewith are pressed back, so that

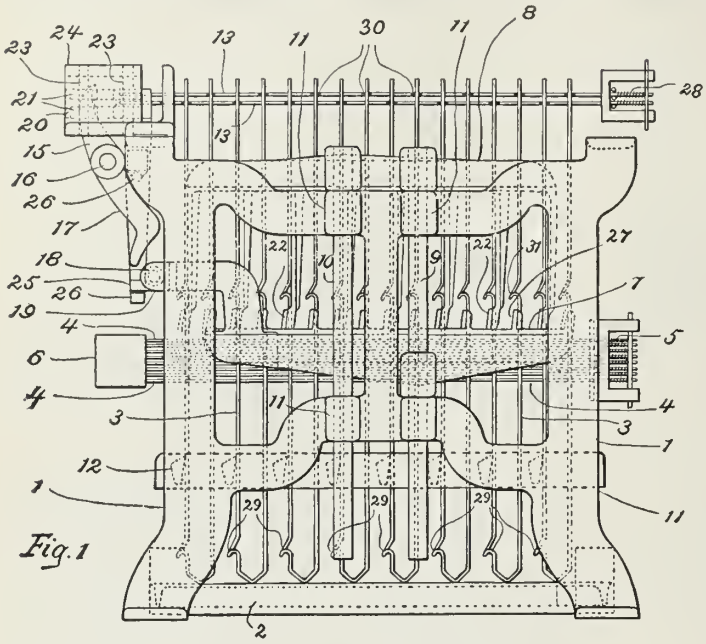


Fig. 1

the said crooks thereof shall be out of the path of the ascending griff. Thereby the ascending griff is prevented from picking up a descending hook and raising it at a time when it should be lowered into a depressed position. Wires are arranged to engage with the hooks 3 and they are moved transversely with relation to the griffs at the proper moment in the working of the Jacquard machine, so as to press the disengaged crooks on the said hooks out of the path of the ascending griff blades. These wires are shown in the illustrations as a set of supplemental needles 13, having eyes where they engage with the hooks 3 as at 30. Springs 28 press the needles 13 toward the left, in the illustrations, but when these needles 13 are moved toward the right, they press the limbs of the hooks to the right also, thereby carrying laterally clear of the ascending griff blades those crooks 31 which are not in engagement with either the ascending griff blades or the descending griff blades. The mode of operating the needles 13 and of arranging and connecting the same with their actuating devices can be done in different ways.

In Fig. 3 a press bar 14 is shown arranged to act against the ends of all the needles 13, so that when movement is given to the said press bar 14 toward the right in the said figure all the limbs of all the hooks 3 shall be pressed in the same direction. This will operate to carry toward the right clear of the ascending griff blades all the crooks which are not in engagement with moving griff blades. The movement will not be sufficient to disengage from the moving griff blades the crooks which are in engagement therewith, and the limbs on which such crooks are formed will simply bend under the pressure which is exerted against them by the needles 13. For the purpose of operating the press bar 14 at the proper times there is provided an arm 15 turning on a rock shaft 16. This rock shaft is provided with a cam shaped arm 17, against which latter acts a roller 18, carried by a projection 19 from the moving griff frame 8. The roller 18 acts against the cam shaped portion of the arm 17 in both the upward movement and the downward movement of the griff frame 8, so that the needles 13 are operated in proper season every time the respective griff blades 27 and 22 pass each other.

The arrangement that is shown in Fig. 3 is intended to press back all the limbs of the double hooks at every action of such bar. In some cases it may be desired to press back only one half of the said limbs at a time in order to reduce the strain on the parts which operate the press back devices as well as in order to lessen the danger of accidental dislodgment of the crook of a hook from the griff blade with which such hook is descending. To this end the needles 13 are divided into two sets, and the operating devices so contrived as to operate the said sets alternately, so that at each action of the parts only those needles are pressed back which correspond with the limbs that normally coöperate with the particular griff which for the time being is rising. In Figs. 1 and 2, the press bar 14 is arranged to operate only a part of the needles 13 at each movement of the same, toward the right, the remaining part of such needles being operated at the next movement of the press bar to the right, and so on. In this instance

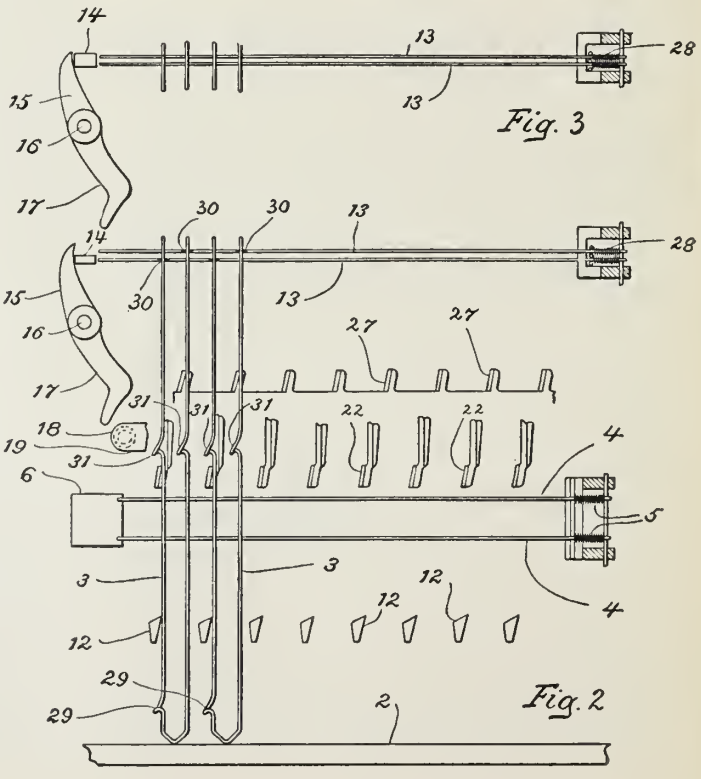


Fig. 3

Fig. 2

the needles are arranged in two sets, one above the other, and means are combined with the press bar 14 for shifting the same vertically, so that when in one position it shall act against the upper set of needles 13, and when in the other position it shall act to move the other set of needles 13. Each end of the said press bar is supported by a carrier 20, having therein a horizontal slot which receives the said end of the press bar and along which the said end is free to be moved toward and from the ends of the needles 13 by means of the actuating devices previously described.

The upper part of the carrier 20 is formed with lugs 21, having holes therethrough, the said holes receiving guide pins 23, which are applied to a stand 24, which is connected with a fixed part of the frame work. A pin 25 projecting from the arm or bracket 19, operates the carrier 20 by striking against the lugs 26, respectively, as the griff frame 8 with which such projection 25 is connected nears the respective ends of its vertical reciprocation, thereby shifting the said carrier and with it the press bar, so that the said press bar shall be placed in position to operate one set of the needles 13 during the descent of the griff frame 8, and then placed in position to operate the other set of needles during the rise of griff frame 8. Sufficient friction between the carrier 20 and the guide pins 23 is provided for, in order to enable the carrier to remain in its elevated position after being raised by contact of projection 25 with the upper lug 26 in the ascent of griff frame 8 until it is depressed positively by the engagement of the pin 25 with the lower lug 26 in the descent of the griff frame 8.

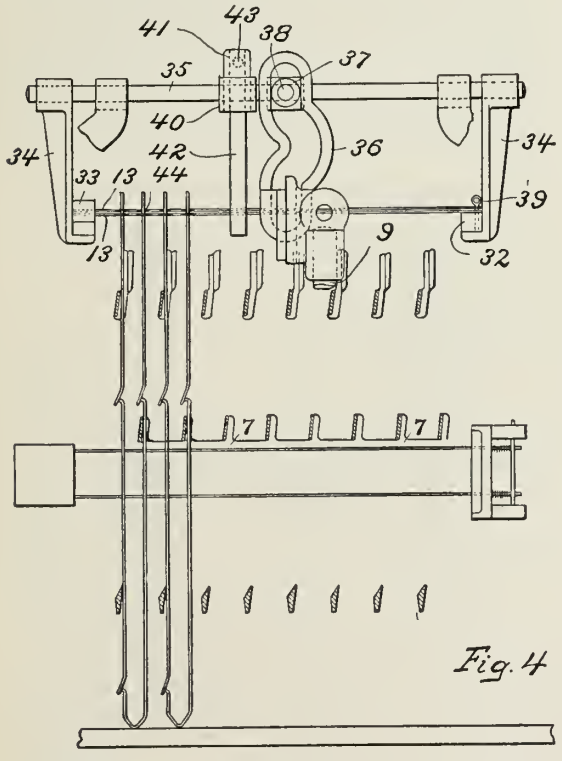



Fig. 4

In place of using the arrangement of press back needles 13 as previously illustrated and explained, the arrangement as shown in Figs. 4 and 5 can be employed.

Fig. 4 is a view, mainly in transverse vertical section, of portions of a double action Jacquard machine, showing a different mode of operating the press back needles 13. Fig. 5 is a view in detail, showing more especially the form of the press back needles and the manner of engagement with the hooks.

In this arrangement the press back needles 13 are mounted in a movable carrier, consisting of cross bars 32, 33, to which the opposite ends of the needles 13 are applied, supporting arms 34, by which the said cross bars are upheld, and slide rods 35, to which the supporting arms 34 are attached.

With the carrier for the press back needles is combined means for reciprocating the said carrier horizontally in proper timing with reference to the movements of the two moving griffs, whereby each time the said moving griffs pass each other the carrier and press back needles are operated to bear the hooks laterally in order to move the crooks of the disengaged descending hooks laterally clear of the blades of the ascending griff, and thereby prevent the engagement of such crooks with the said blades. The carrier is operated from one of the moving griffs or a part connected, and moves in unison therewith.

Examining illustration Fig. 4 we find a cam in engagement with a pin or roller, one of the said parts being connected to move with one of the moving griffs and the other being connected with the carrier. The cam 36 is attached to the slide rod 9 of the griff frame 7, while the roller 37, which is engaged by the said cam is mounted on a pin 38, which is attached to slide rod 35. The cam 36 is a slotted cam so as to move the carrier positively in both directions horizontally, and is shaped to occasion a complete reciprocation of the said carrier in each complete vertical movement of the cam up or down. Thereby each time the moving griffs pass each other at an intermediate point in their vertical traverse, the carrier, with the press back needles mounted therein, is moved toward the right, so as to carry the disengaged crooks of the hooks out of the path of movement of the ascending griff blades.

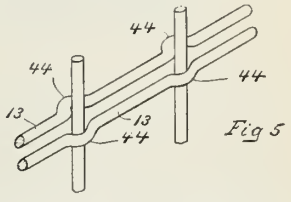



Fig 5

The ends of the press back needles 13 at the left in Fig. 4 are inserted into horizontal holes in the cross bar 33. The right hand ends of the said needles 13 are bent to form eyes, through which are passed the stems of pins 39, entering vertical holes that are provided in the said cross bar. This manner and means of applying and connecting the press back needles 13 to the cross bars 32, 33, provides conveniently for the support and retention of the said needles in the carrier and facilitates the application and removal thereof.

To each slide rod 35 of the carrier is made fast a collar 40, being located at or near mid length of the said slide rod. This collar is provided with an arm or lug, as 41, and to the said collar and arm or lug a vertical strip 42 is affixed by means of bolt 43. To the depending portions of the strips 42 are secured the opposite ends of a bar extending crosswise of the machine immediately below the press back needles 13 and parallel with the cross bars 32, 33.

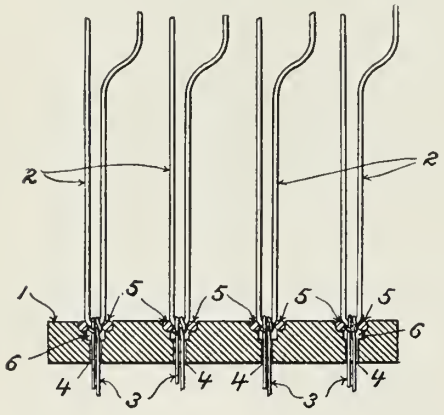
There is a brace running through the center of the press back needles 13 to separate the latter from one another and restrain them from transverse or side movement. This brace reciprocates horizontally in unison with the carrier and the press back needles, it being a part of the carrier.

The press back needles 13 are formed as shown in illustration Fig. 5, which shows two rows thereof, one row being located immediately above the other. Each needle 13 is formed with a succession of half eyes therein, as at 44, for the reception of the prolonga-

tions of the hooks above the upper crooks 31 of the latter, these half eyes being of a semicircular shape. Two needles are used in conjunction, one being located immediately above the other, the said needles being turned so that their half eyes face in opposite directions, as shown, whereby each of such needles serves to retain the limbs of the corresponding series of hooks in the half eyes of the other of such needles. This use of needles in pairs and formed with half eyes, permits the discarding of needles having round eyes, the needles with half eyes being cheaper to make and much more easily and conveniently put into the machine and taken out. *(Crompton and Knowles Loom Works.)*

## BOTTOM BOARD FOR JACQUARD MACHINES.

The purpose of this bottom board is to obviate wear from contact of the bottom ends of the hooks




therewith and cutting or wear of the neck cords where they are connected with the hooks.

The illustration is a vertical transverse sectional view of the board, showing also portions of four hooks of the Jacquard machine, together with portions of the neck cords connected therewith.

1 designates the bottom board, 2 the hooks and 3 the neck cords as passing through holes 4, of the bottom board.

The novelty of the new board consists in laying parallel with each other, wire strips 5 on opposite sides of each line of holes 4 and on which wire strips 5, rest the bottom ends of the hooks when the latter are in their lowest position. These wires or strips 5 protect the bottom board from wear resulting from the contact of the bottom ends of the hooks therewith.

The wear of the wires or strips 5 is very slight, and takes place very slowly, and since the said wires or strips prevent the bottom ends of the hooks from cutting into the material of the bottom board and thereby descending sufficiently far to bring the portions of the neck cords, which pass around the said ends of the hooks into contact with the material of the bottom board around the upper ends of the holes 4, it follows that the wear and cutting of the said neck cords heretofore (in the use of common bottom boards) arising from such contact are prevented.

For the reception of the portions of the neck cords which pass around the bottom ends of the hooks parallel grooves 6 are formed along the upper face of the bottom board 1, each of such grooves intersecting the upper ends of the holes 4 of one line or series of the said holes, at the same time the grooves 6 exceed in width the diameter of the holes 4. The wires or strips 5 are located at opposite sides of each of the grooves 6, and are held in place by means of screws driven at intervals between the pair of wires or strips 5. The head of each screw is arranged to overlap and engage with both wires or strips 5, thereby serving to secure both of the latter in place. *(Crompton and Knowles Loom Works.)*

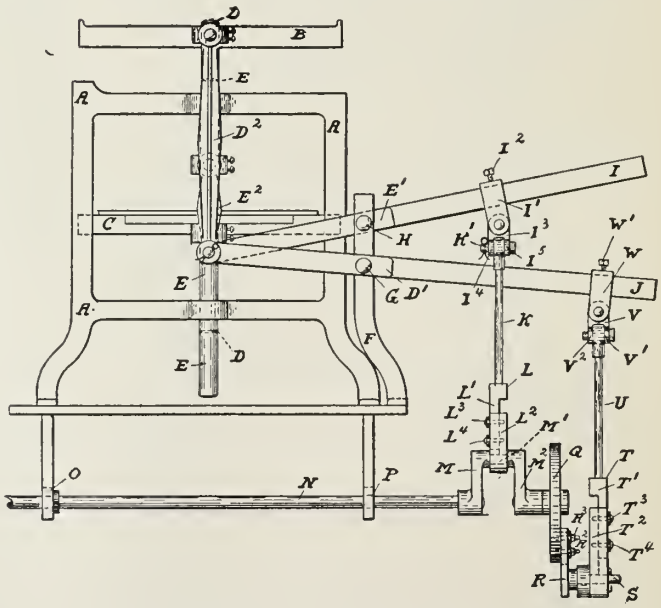
## METHOD OF OPERATING THE GRIFFS IN JACQUARD MACHINES.

The device relates to means for moving the upper and lower griffs in a rise and fall Jacquard to and from each other. In order to accomplish this, the well known eccentric principle, as it is used in any double acting engine, is applied, and where a simultaneous up and down motion is required and created by having two double cranks, making the second double crank a single crank, inasmuch as in this instance there are only two levers requiring motion.

The illustration shows a side view of a Jacquard machine with only the necessary elements shown as required to explain the new mechanism.

A indicates the frame of the Jacquard, B the upper grift, C the lower griff, D one of the upper griff vertical elevating bars, E one of the lower griff vertical elevating bars, $D^1$ the upper griff motion lever, $D^2$ one of the upper griff connecting rods, $E^1$ the lower griff motion lever, and $E^2$ one of the lower griff connecting rods, each of which pairs of connecting rods $D^2$ and $E^2$ is connected, respectively, with the motion levers and the upper and lower griffs. The motion levers $D^1$ and $E^1$ are pivoted in the standard F at the fulcrums G and H.

Attached to the arm I of the motion lever $E^1$ is an




adjustable clamp $I^1$, secured to the arm by a set screw $I^2$. Pivoted to this clamp is a knuckle joint $I^3$, which,

between its two arms $I^4$ and $I^5$, has a connecting rod K, pivoted on the pin $K^1$. Said connecting rod K is furnished at its other end with a strap L that connects the rod K with the crank pin $M^1$ of the crank M on the shaft N. The strap L is formed of two parts $L^1$ and $L^2$, of which $L^1$ has a connecting rod K attached to it and is constructed so as to be able to perform a telescopic movement in combination with $L^2$—that is, slide up and down in a guideway cut out in $L^2$, to which part it is attached by screws $L^3$ and $L^4$.

This telescopic adjustment will easily be recognized as permitting a shortening or lengthening of the up and down movement of the arm I, and consequently also of the lower griff C. The shaft N, mounted in bearings at O and P, has secured to it, as stated before, the double crank M (having a crank pin $M^1$) of which the arm $M^2$ has a disk Q secured to it. Attached to said disk is an arm R, having a slot through which pass bolts $R^2$ and $R^3$, which bolts, passing through any of the desired holes in the disk secure the arm R to the disk Q. By means of the slot in the arm R and the holes in the disk Q the eccentricity of a pin S, attached to the arm R, can be increased or decreased, as required. Pin S represents the free pin of the second crank, and virtually represents, in connection with the arm R and the disk Q, an adjustable eccentric motion. This motion is transmitted to the arm J of the motion lever $D^1$ in the same manner as the motion from the crank M is transmitted to the arm I of the motion lever $E^1$.

The strap T regulates the length of the up and down movement of the arm J of the motion lever $D^1$ and is composed of two pieces, $T^1$ and $T^2$, the piece $T^1$ being able to slide in the piece $T^2$ and being secured to it by screws $T^3$ and $T^4$, the same as in the instance of the strap L. The connecting rod U has one end attached to the part $T^1$ and the other end pivoted between the arms $V^1$ and $V^2$ of the knuckle joint V, which is pivoted to the clamp W, attached to the arm J by the set screw $W^1$. *(James Jackson and Sons, Paterson, N. J.)*

## DEAN'S DRIVING MECHANISM FOR RISE AND FALL JACQUARDS.

Fig. 1 is a side elevation of a Jacquard machine, showing the mechanism for operating the griffs and batten. Fig. 2 is a detail view of one eccentric on back of top gear wheel.

The upper griff D is operated, or caused to rise and fall, by means of the upper eccentric *d*, having a rod $d^1$ and the strap $d^x$. The gear wheel 3 is mounted on stud $e^1$, the eccentric 5 being secured to its outer face and the upper eccentric *d* being secured to its inner face, the long collar *e* of the wheel 3 passing through said eccentrics, the eccentric *d* having an elongated slot $d^2$ to permit adjustment as required. The eccentric *d* is secured to gear 3 by a bolt $d^3$, passing through a radial slot in gear 3. The rod $d^1$ is connected to the griff D at the joint *f*.

The lower griff E is operated by the lower eccentric *h*, which, like the upper eccentric *d*, is secured on the gear wheel 2.

Both the upper and lower eccentrics which operate the griffs are located inside of the gear wheels 2 and 3. The lower eccentric *h* has the rod *h'*, which is secured at the joint *h''* to the rod *n*, to which is secured the lower griff E, and the upper griff D slides on the rods *n*.

The driving mechanism operates as follows: Power being communicated to the shaft S the gear wheels 1 on the ends thereof revolve, causing the upper gear wheels 2 and 3 also to revolve, and the batten holding the card cylinder is caused to oscillate by means of an eccentric on the outer face of the upper gear wheels 3. The upper griff D is caused to rise and fall by means of the upper eccentric *d* on the inner face of the gear wheel 3, said eccentric having a rod

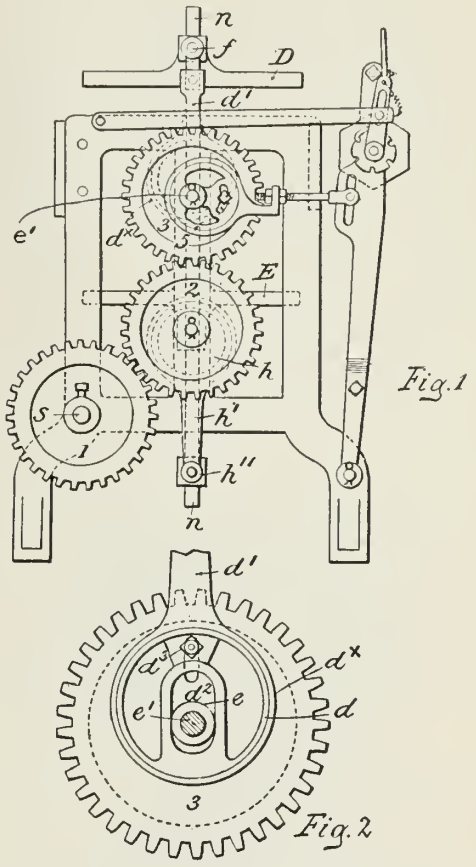



Fig. 1

Fig. 2

*d'* and the strap $d^x$, and the lower griff E is operated by the lower eccentric *h*, which is secured on the inside of the gear wheel 2. *(J. Dean, J. F. Kerr and G. Simpson, Paterson, N. J.)*

## SHELDON'S RISE AND FALL JACQUARD.

The object is to produce an increase of speed and overcome the jarring of the harness cords, thereby preventing the same from becoming tangled.

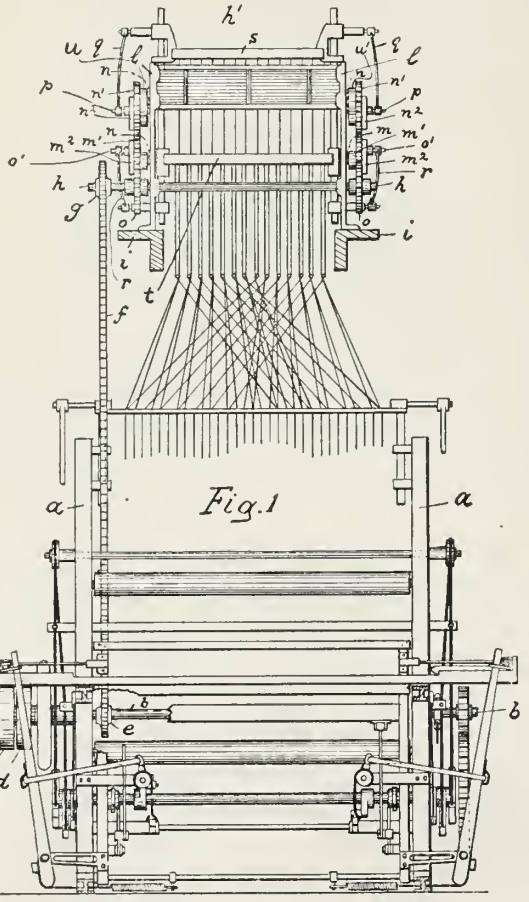
Fig. 1 is a front elevation of a loom in connection with the improvements attached to the Jacquard machine, parts of the loom being broken away to better show the main shaft in connection with the sprocket wheel and chain to impart motion to the Jacquard machine. Fig. 2 is an enlarged end section of the Jacquard machine. Fig. 3 is an enlarged cross section of one of the gear wheels, showing the construction of the slot.

*a* represents the main frame of the loom, having a main driving shaft *b*, on which is secured a fast and loose pulley *c* and *d*, connected by belt connection to the main driving shaft (not shown). On this main shaft *b* is secured a sprocket wheel *e*, having a chain *f* engaging with a corresponding sprocket wheel *g* on the main driving shaft *h* of the Jacquard machine *h'*. *i* indicates the cross beams to which the

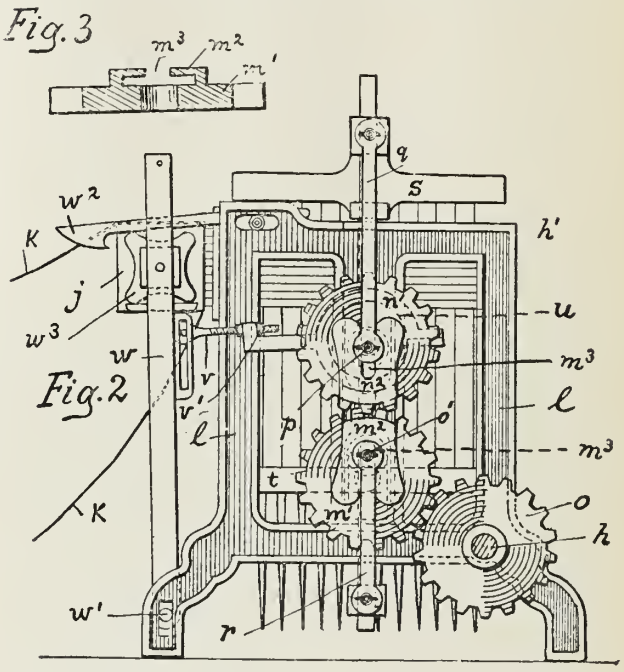
Jacquard machine is secured. *j* represents the cylinder and *k* the series of pattern cards. The frame *l* of the Jacquard machine *h'* is provided with studs *m* and *n*, on which are secured gear wheels *m'* and *n'*, meshing into each other. The gear wheel *m'* also meshes with a gear wheel *o* on the main driving shaft *h* of the Jacquard machine.

On the gear wheels *m'* and *n'* are formed integral therewith raised projections $m^2$ and $n^2$, each having an opening $m^3$ for the reception of the shaft *o'* and *p* for connecting the vertical arms *q* and *r*, secured to the griffs *s* and *t*, operating the hooks. Said vertical arm *q* is secured at its upper end to the griff *s*, and the vertical arm *r* is secured at its lower end to the griff *t*, as shown in Fig. 2. These shafts *o'* and *p* can be adjusted in said openings $m^3$ to suit the operator and can be so arranged as to increase the speed of the rise and fall of the griffs, as will be understood upon referring to Fig. 2.

To the hub *u* of the gear wheel *n* is secured an eccentric *u'*, connected by the arm or lever *v* to the lever *w*, having the roller or cylinder *j* secured thereto. Said lever *w* is fulcrumed at *w'* on the frame *l* of the Jacquard machine. Arm or lever *v* is so constructed as to allow for adjustment by the nut *v'*, as




shown in Fig. 2. The object of this arm or lever *v*, connected to the eccentric hub *u* of the gear wheel *n*, is to give said lever *w* a backward and forward motion, so that the catch $w^2$ will come into engagement with the wheel $w^3$, so that the cards are moved by each revolution of said main driving shaft. The weight of the wheels *m' n'* being placed upon studs upon the frame, the operator is enabled to get a high




speed from this machine. *(Samuel Sheldon, Paterson, N. J.)*

## HALTON'S LINGO FOR WIRE HEDDLES.

The object of this lingo is to produce a weight for wire heddles that will prevent it from swinging on the heddle, and thus constitute a substantially rigid continuation of the same, thereby overcoming that liability to entanglement which is an objection to ordinary lingoes loosely hung upon the heddles.

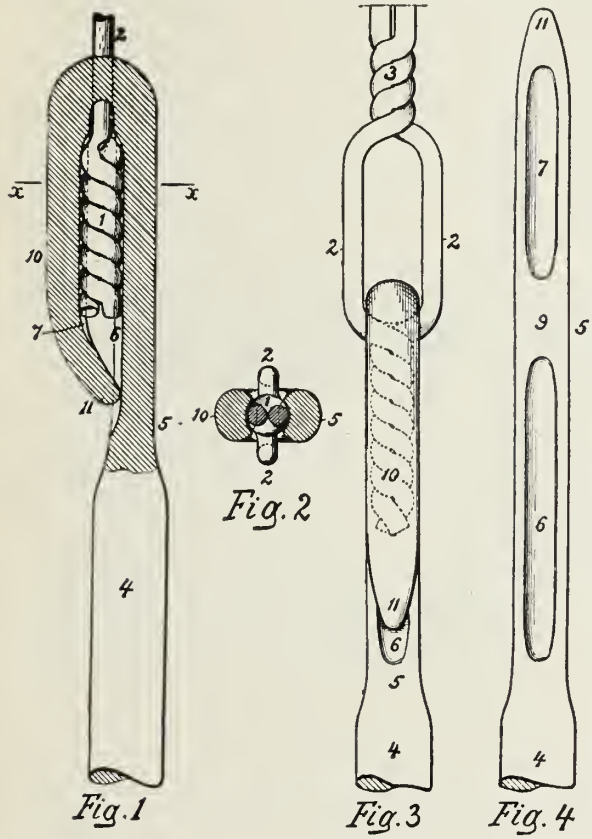
Fig. 1 is a view, partly in vertical section and partly in elevation, of the upper end of this lingo, showing the lower portion of the heddle to which said lingo is hung. Fig. 2 is a transverse section on the line x-x, Fig. 1. Fig. 3 is a front view of the upper portion of the lingo and of the hooked lower end of the heddle to which it is hung, and Fig. 4 is a view, illustrating the preparation of the blank for the lingo before the head of the same is bent.

An ordinary wire heddle is composed of a pair of wires which at the lower end are twisted together, as shown at 1, then separated so as to form an eye or loop 2, and then again twisted above the latter, as shown at 3, the eye or loop 2 being intended for adaptation to the hooked upper end of the lingo with which the heddle is usually furnished. If, however, this lingo is loosely hung to the eye 2 of the heddle, said lingo is free to swing laterally and entanglement of and injury to both lingoes and heddles frequently results.

In order to overcome this objection the new lingo is made in the following manner: a piece of wire 4 of proper dimensions is slightly reduced at the upper end, as shown at 5, in Fig. 4, this reduced portion of the wire being oval in cross section, as shown in Fig. 2. In one side of this reduced portion of the wire are then formed concave recesses 6 and 7, separated from each other by a portion 9, and the reduced por-

tion 5 of the wire is then bent at the center of this portion 9, so as to form the hook of the lingo and bring the recess 7 opposite to the upper portion of the recess 6, the point 11 of the tongue 10 of the hook being reduced in thickness, as shown in Fig. 3, and depressed, as shown in Fig. 1, so as to enter the lower portion of the recess 6.

The tongue 10 of the hook possesses such resiliency that its point can be readily raised, so as to permit of the slipping of one of the wires of the eye 2 of the heddle beneath the same, and when the lingo is turned around into a position in line with the heddle the lower twist 1 of said heddle will enter between the shank and tongue of the hook and will find



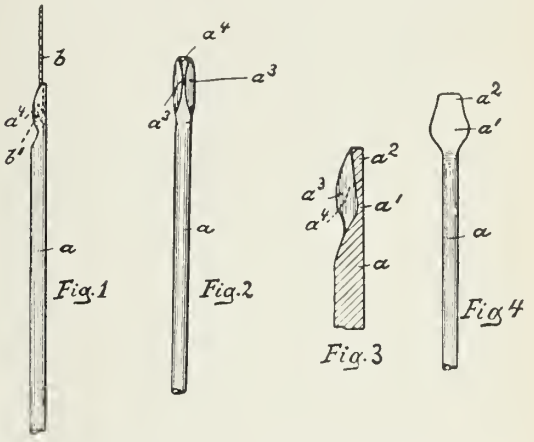

a bearing in the opposite recesses 6 and 7 of said shank and tongue. Hence any tendency of the lingo to swing on the heddle is arrested by the engagement of the twisted portion of the heddle with the lingo and entanglement of and injury to lingoes or heddles is prevented, at the same time precluding the possibility of the unhooking of the lingo from the heddle. *(Thomas Halton's Sons, Philadelphia, Pa.)*

## RIGBY'S LINGO.

The object is to provide a lingo which permits a ready and quick connection.

Fig. 1 is a side elevation of this lingo and of a portion of a heddle connected therewith, Fig. 2 is a front elevation of Fig. 1, Fig. 3 an enlarged transverse section through the upper portion of Fig. 1, and Fig. 4 a front elevation of the lingo with the head flattened out.

*a* is the body of the lingo, the upper portion of which is flattened out, as at $a'$ and $a^2$, and the ears or flaps $a^3$ thus produced are bent to form a conical




shaped channel $a^4$, which shape is produced or obtained by diminishing the thickness of the head in its central portion $a'$ and leaving the top portion $a^2$ thicker than said central portion. By this arrangement not only a seat for the knot $b'$ of the heddle $b$ is formed within the conical channel $a^4$, but the wall constituting said channel is greatly strengthened, the thicker portion $a^2$ on one side and the body $a$ on the other side strengthening and protecting the thin portion $a'$, and thus preventing its splitting.

As the flaps $a^3$ $a^3$ do not come in close contact with each other, a slot is formed between them, of a size sufficient to permit the quick and ready connecting with the heddle. *(Holden Rigby, Paterson, N. J.)*

## ROYLE'S FOOT POWER PIANO CARD STAMPING MACHINE.

In this machine provision is made for placing a plurality of punches under the control of a single key. The feed mechanism and the mechanisms for controlling the locking and releasing of the punches, are also improved, compared to other machines, so that the said mechanisms may be actuated by the punch operating mechanism or by hand at the will of the operator.

Fig. 1 is a view of the machine in side elevation, certain of the smaller parts being omitted. Fig. 2 is a horizontal section through the punch and key supporting head, Fig. 3 is a vertical section through the head, Fig. 4 is another vertical section through the head, Fig. 5 is an enlarged view in end elevation showing the operating mechanism at the end of the key and punch supporting head, Fig. 6 is an enlarged partial top plan view of the feed mechanism, and Fig. 7 is a view of the same in side elevation.

The frame work of the machine consists of a bed plate A, supported upon legs A'. The treadles, one for depressing the bank of punches and the other for elevating or returning the bank of punches, are denoted, respectively, by B B'. The former, B, is connected by a rod *b* with the end of a lever $b'$, supported upon a vertically adjustable fulcrum $b^2$, attached to a fixed portion *a* of the frame. The lever $b'$ is connected intermediate of its fulcrum and its free end, as at $b^3$, with the guide rods C C', which support the punch and key carrying head, so that when the lever B is depressed, as shown in Fig. 1, the bank of

punches will be brought down into engagement with the card to be punched. The lever $b'$ is also connected by a rod $b^4$ with one arm of a vibrating lever $b^5$, pivoted to a hanger $a'$, the opposite arm of said lever $b^5$ being connected by a rod $b^6$ with the treadle B', so that when the treadle B is depressed, as shown in Fig. 1, to bring the punches into engagement with the card it will at the same time elevate the treadle B' into the position shown in Fig. 1, and when the treadle B' is depressed, it will in turn, through the connecting rods $b^6$ $b^4$ and the vibrating lever $b^5$, lift the free end of the lever $b'$, and thereby raise the punches from the card and at the same time raise the treadle B ready for a repetition of the punching operation. The reciprocating movement of the treadle B' operates the feed and controls the effect of the punch locking keys.

One of the prominent features of this machine is the structure and arrangement of the punch locking keys and the parts which coöperate therewith, by which one or more of the keys—in the present instance, each key—is made to control the locking of a plurality of punches. The punch and key carrying head for the purpose of assembling the several parts, gaining ready access thereto, and keeping them in order is made of three longitudinal sections $c$ $c'$ $c^2$, the rear section $c$ being of a depth or thickness substantially equal to the combined thicknesses of the two front sections $c'$ $c^2$, the front of the rear section $c$ and the rear portions of the front sections $c'$ $c^2$ being cut away to form a central opening $c^3$, extending vertically through the head, in which opening the parts for directing the tips of the keys and for returning the locking bars to their normal position are made to operate. The several sections of the head are firmly secured together and are finally surmounted by a cap piece $c^4$, which serves as a hand rest for the operator when manipulating the keys.

In the illustrations are shown a bank of eight keys, each of which is represented by D, for locking the punches which are to punch the holes in the cards. The punches for punching the holes in the cards are twice as many in number as the number of keys D, one group of eight of said punches being denoted by E and the other group of eight being denoted by E'. The keys D are spring actuated and are made to reciprocate horizontally through the rear section $c$ of the head, and each is provided with a movable tip $d$, pivoted to the shank of the key D, so as to be swung into a higher or lower plane as may be desired. The locking bars for locking the bank of punches are arranged in two banks in different vertical planes, the one bank being under the control of the keys D when their tips $d$ are raised and the other bank, being under the control of the keys when the tips $d$ are lowered. The several locking bars $e$ $e'$ are each provided with a shoulder $e^2$, by means of which they are engaged by a retracting plate F through a slot $f$, in which the banks of locking bars project into the opening $c^3$ in the head. The retracting plate F is made to reciprocate away from and toward the front wall of the opening $c^3$ by means of arms $g$ $g'$ on a rock shaft G mounted in bearings beneath the punch and key supporting head and subject to a rocking movement by means of a cam H on the hub of a lantern pinion $h$, which cam engages operating arm $g^2$, fixed on the rock shaft G. At each depression of the pedal B' the lantern pinion $h$ is actuated through the action of a connecting rod $b^7$, leading from the pedal B' to an arm $i$ on the rock shaft I, journaled in supporting brackets $a^2$ on the bed plate A, and provided with an arm $i'$ carrying a hook pawl $i^2$, which extends from the arm $i'$ into engagement with the pins on the lantern pinion $h$.

The bank of locking bars $e$ is arranged to lock the group of punches E, and the bank of locking bars $e'$ is arranged to lock the group of punches E', while both banks of locking bars $e$ and $e'$, or one or more individual members of the banks which may have been advanced by the keys, are returned from their locking positions by the rearward movement of the plate F at each depression of the treadle B'. The cam H for operating the shaft G, and hence the retracting plate F, is provided with four operating projections at equal

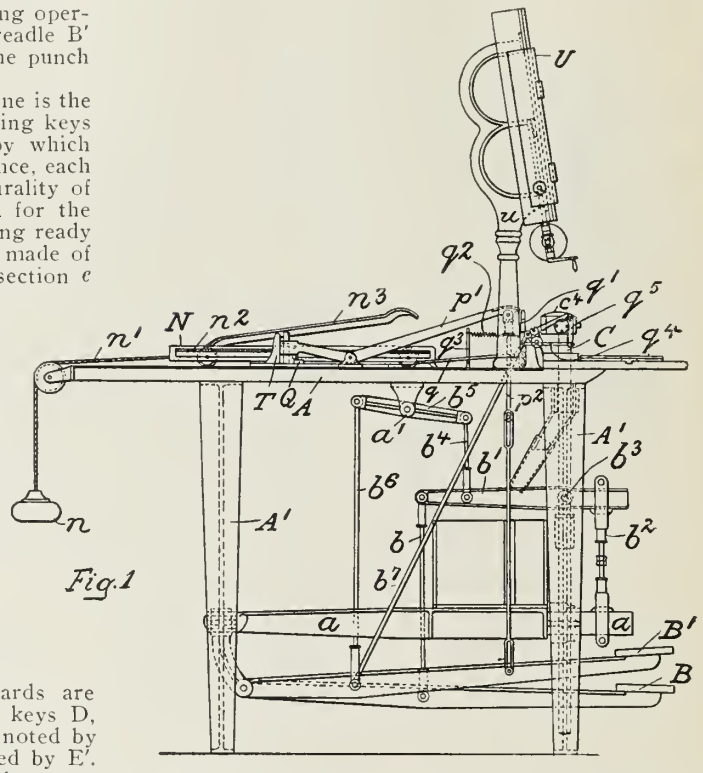



Fig. 1

distances apart and is turned a quarter revolution by the pawl $i^2$ at each depression of the treadle B' to rock the shaft in a direction to throw the retracting plate F rearwardly and then permit the shaft G to rock back into position, and with it the retracting plate F, to leave the locking bars free to be operated by the keys.

In connection with the swinging tips $d$ at the ends of the keys D there is provided a vertically movable tip adjusting plate K, through which the tips $d$ extend, the said plate K being pivoted, by means of arms $k$ and $k'$ at its ends, to the rear section of the head, as shown at $k^2$ $k^3$. When the plate K is in its lowermost position, the tips are in position to engage the bank of locking bars $e$, and provision is made for lifting the said plate, K, and with it the tips $d$, to bring them into position to engage the bank of locking bars $e'$. This is accomplished by means of the bevel faced nose $k^4$ on the end of a sliding pin $k^5$, which pin is provided with a retracting spring $k^6$ and has its head projecting from the front of the punch and key carrying head, in position to be operated by the thumb of the operator when so desired. The pin $k^5$, and with it the adjustable plate K, is operated automatically from the treadle B' by means of the rock shaft I, which carries at its end opposite that where the hook pawl $i^2$ is attached an arm $i^3$, having pivoted thereto a hook pawl

$i^4$, which engages pins on a lantern pinion $h'$, provided on its hub with a cam H', which cam operates an arm $k^7$ on a short rock shaft $k^6$, which also has fixed to rock therewith an arm $k^9$, having a pin and slot engagement with the sliding pin $k^5$. The cam H' is provided with extensions for operating the sliding pin $k^5$, located diametrically opposite each other, and serves to advance the sliding pin $k^5$ twice during a revolution of the lantern pinion $h'$ or one half as often as the retracting plate F is operated by the shaft G.

The effect of the cam H upon the retracting plate to move it to the limit of its rearward movement and back again into normal position takes place during each vertical adjustment of the tips $d$ by the adjusting plate K, controlled by the cam H', so that such of the locking bars as may have been operated in the lower bank will be returned to their normal positions before the locking bars of the upper bank are thrown into locking position, and *vice versa*, thereby leaving only such punches locked as are intended to make additional holes at each operation of the bank of keys.

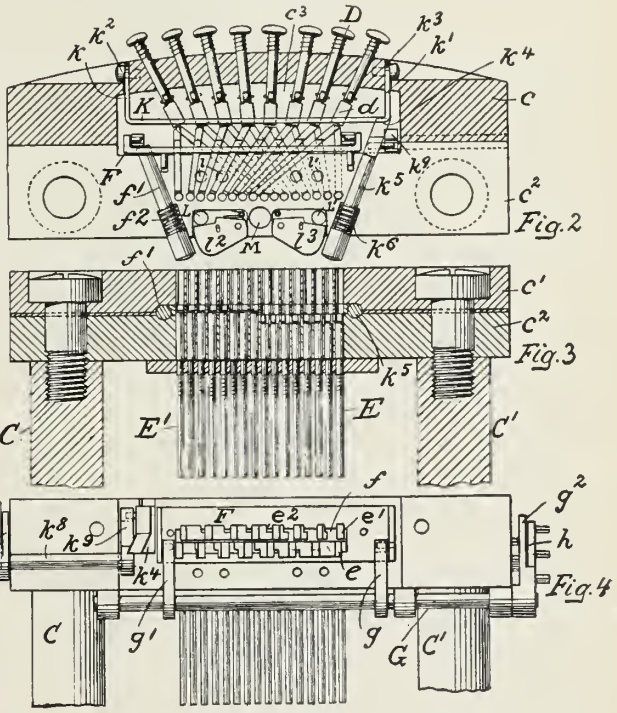
For the purpose of operating the retracting plate F by the thumb instead of by the treadle whenever the operator so desires, a push pin $f'$ is provided, the head of which projects from the front of the key supporting head, the said pin being provided with a retracting spring $f^2$.

In addition to the punches for punching the pattern holes in the card, two sets of lace hole punches and a peg hole punch are provided. In one set of lace hole punches provision is made for a single lace hole at each of two or three positions along each edge of the card, as is common, while in the other set of lace hole punches provision is made for groups of two lace holes at each of two or more positions along the edge of the card. The locations of these two groups of lace hole punches are denoted by the positions of the punch receiving sockets in Fig. 2, the set of single lace hole punches being denoted by L L' and the set of double lace hole punches by $l$ $l'$. The punches L L' are controlled by spring actuated thumb plates $l^2$ $l^3$, which may be pressed across the punch sockets to lock the punches L L' in operating position when so desired, and the punches $l$ $l'$ are controlled by special spring actuated pins, located below the keys D and extending horizontally into position to lock the punches in operative position when desired. The punches $l$ $l'$ are smaller than the punches L L', and may be used either in groups of two or singly, as may be desired.

The punch for stamping the peg hole M is locked in operative position by means of a spring actuated plate which projects from the front of the punch carrying head and may be pushed rearwardly to lock the peg hole punch in operative adjustment.

As the pattern hole punches are arranged in a single line and operated by a single set of keys in groups, it is important that the feed of the card should take place only after each second operation of the punches whenever the entire bank of punches is being utilized for the pattern. To provide for this, a feed mechanism is arranged which will automatically skip each alternate step, if so desired, or it may be made to feed at every step whenever such a feed is required.

On the bed plate A there is mounted a feed carriage N for feeding the card to be punched step by step beneath the bank of punches. The carriage is constantly drawn toward the rear by means of a weight $n$, attached to the rear end of the carriage by a cord $n'$. The movement of the carriage under the influence of the weight $n$ is controlled by a rack bar $n^2$, fixed to the side of the carriage N, the teeth of which are engaged by a stationary and a movable tooth on a reciprocating escapement head O (see particularly Figs. 6 and 7) guided in its vertically reciprocating movements by means of guide pins $o$ $o'$, fixed in the bed plate A. The fixed tooth $o^2$ is attached at the front of the head and projects past the end of the head, as clearly shown in Fig. 6, in position to engage the teeth on the rack bar $n^2$. The movable tooth $o^3$ is fixed to the front of a sliding plate, which has rearwardly extending stem $o^5$, which passes through an opening in the head O and through a housing $o^6$, fixed to the rear of the head, and is provided at its rear end with an adjusting nut $o^7$ and a locking nut $o^8$ for the purpose of adjusting accurately the tooth $o^3$ relatively to the tooth $o^2$. The tooth $o^3$ is held normally advanced from the tooth $o^2$ a distance equal to that between two successive teeth on the rack bar $n^2$ by means of a spring (not shown), interposed between a shoulder on the stem $o^5$ and the rear end of the housing $o^6$. A vulcanized rubber washer $o^9$ is inserted between the lock nut $o^8$ and the rear end of the housing $o^6$ to relieve the shock upon the tooth $o^3$ when it is returned to its normal position under the influence of the spring previously referred to. The plate to which the movable tooth $o^3$ is fixed, is permitted a rearwardly and forwardly sliding movement within a slot formed in the front of the escapement head O.




The escapement head O is reciprocated on the guides $o$ $o'$ by means of an arm $p$ of an operating lever, pivoted at P to the bed plate A and having its forwardly extending arm $p'$ connected by a longitudinally adjustable rod $p^2$ with the treadle B'. The fixed tooth $o^2$ is located in a plane above the plane of the tooth $o^3$, so that when the head O is depressed to bring the fixed tooth $o^2$ into full engagement with the rack bar $n^2$ the movable tooth $o^3$ will occupy a position below the rack bar and out of engagement with its teeth. The arm $p$ of the escapement operating lever is drawn normally downward by means of a retracting spring $p^3$, connecting it with the bed plate. The connection of the arm $p$ of the lever with the escapement head is formed by means of a pin, the body portion of which

is seated in a socket in the head O and the head of which is held in an elongated open slot in the rear end of the arm $p$. This admits of the vertically reciprocating movement of the escapement head by the

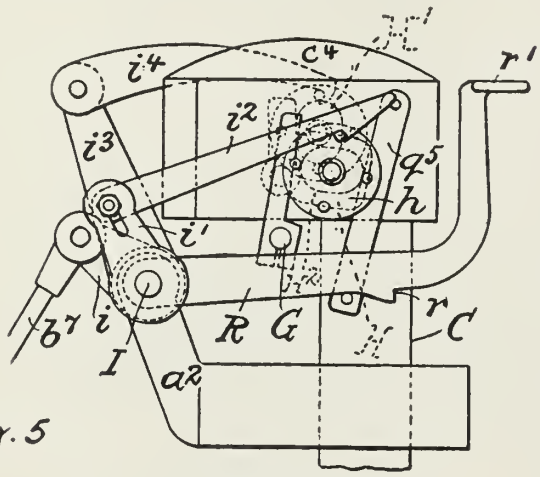



Fig. 5

swinging movement of the rear arm $p$ of the operating lever without any tendency to bind.

As thus far described, the carriage N, and hence the card which may be attached thereto, would be fed rearwardly one step at each operation of the punch head down and return—that is, with each depression of the treadle B'. This feed would take place as follows:—When the treadle B' is elevated, as shown in Fig. 1, and the punches depressed into position to engage the card, the carriage N will be held stationary by the fixed tooth $o^2$ of the escapement in engagement with the rack bar $n^2$, as shown clearly in Fig. 7. When the treadle B' is depressed to return the treadle B to its normal position to lift the punches out of engagement with the card, the escapement operating lever will be rocked by a downward pull upon its forward arm $p$ and a consequent lifting of its rear arm $p'$, which action will lift the stationary tooth $o^2$ of the escapement out of engagement with the rack bar $n^2$ and at the same time engage the movable tooth $o^3$ with the rack bar. The moment the stationary tooth $o^2$ is lifted out of engagement with the rack bar, the strain upon the carriage by the weight $n$ will draw the carriage and the movable tooth $o^3$ therewith rearwardly against the tension of the spring on the stem of the movable tooth until the plate of the movable tooth engages the rear wall of the slot in the escapement head—that is, a distance equal to the distance between two successive teeth upon the rack bar $n^2$. As the treadle B is again depressed to operate the punches, it will by elevating the treadle B', permit the arm $p'$ of the escapement operating lever to lift under the downward pull of the spring $p^3$ and the fixed tooth $o^2$ of the escapement will be lowered into engagement with the rack bar $n^2$, occupying the same position from which the movable tooth $o^3$ is withdrawn by the downward movement of the escapement head. As soon as the escapement head has reached a downward movement sufficient to free the movable tooth $o^3$ from the rack bar $n^2$, the said tooth $o^3$ will spring forwardly under the impulse of its actuating spring in position to enter into engagement with a succeeding tooth on the rack bar $n^2$, when the escapement head O shall be again elevated by the return movement of the punches and the consequent downward movement of the treadle B'.

For the purpose of preventing the feed of the carriage, and hence of the card that may be attached thereto, at each successive operation of the punches to enable the punch head to be depressed several times—in the present instance twice—intermediate of successive steps of feed, a sliding block Q is provided in position to be slid beneath the escapement head when the latter is elevated to prevent it from moving downwardly a distance sufficient to free the movable tooth $o^3$ from the rack bar $n^2$. The sliding block Q is connected by a rod $q$ with a lever $q'$, fulcrumed at and uprising from the bed plate A a short distance to the rear of the punch carrying head, which lever $q'$ is normally drawn rearwardly into position to insert the sliding block Q beneath the escapement head by means of a spring $q^2$, fastened at one end to the lever $q'$ and at its opposite end to a pin $q^3$, upraising from the bed plate. The lever $q'$ has a removable connection with a hanging arm $q^5$, carried by the punch head in position to engage a cam $H^2$, fixed to rotate with the cam H and of the same general form as the cam H', to which attention has heretofore been called. The cam $H^2$ is, however, set at an angle of ninety degrees to the cam H', so that the effect of the cam $H^2$ in rocking the arm $q^5$ forwardly and hence, through the lever $q'$ and connecting rod $q$, drawing the block Q forwardly, where it will not interfere with the depression of the escapement head, will take place at such time as the cam H' is in position to permit the keys D to operate the bank of locking bars which control the group of punches E; but when the cam H' is in position to permit the keys D to operate the bank of locking bars which control the group of punches E'—the cam $H^2$ will be in position to permit the arm $q^5$ to swing rearwardly, and thereby permit the block Q to rest beneath the escapement head and so prevent the feed of the carriage during the operation of that group of punches.

The operator by pulling forward upon the lever $q'$ may at his pleasure withdraw the block Q from its position to arrest the feed, and whenever so desired, the said lever $q'$ may be locked in its forward position with the block Q removed from beneath the escape-

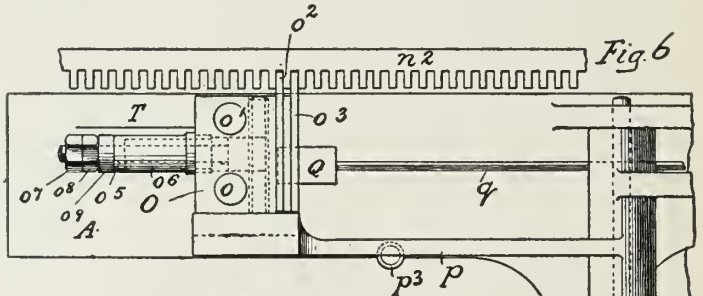



Fig. 6

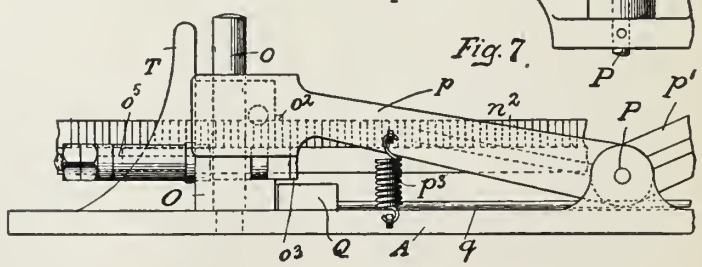



Fig. 7.

ment head, by hooking the forward end of the connecting rod $q^4$ over a shoulder $r$ on a swinging retaining bar R, pivoted on the shaft I and provided with a handle $r'$ within convenient reach of the operator.

The carriage N is provided with a handle $n^3$ for convenience in drawing it forward for engaging a new card to be punched, and when such movement of the carriage takes place the arm $p'$ of the escapement operating lever is depressed sufficiently to throw both of the teeth $o^2$ $o^3$ out of engagement with the rack bar $n^2$. The connecting rod $p^2$, which connects the arm $p'$ with the treadle B′ has lost motion in its connection with the treadle B′ conveniently by means of a slot and pin connection with the treadle which will permit the arm $p'$ of the lever to be depressed without affecting the treadle while the depression of the treadle B′ will at the same time serve to depress the arm $p'$.

An abutment T is located in position to form a bearing for the rear face of the escapement head as it reciprocates upon its guides $o$ $o'$ and serves to prevent the displacement of the escapement head and the teeth $o^2$, $o^3$, carried thereby, by relieving the guides $o$ $o'$ from the concussion due to the abrupt stopping of the carriage at the end of each step of its feed movement. U indicates the reading board for holding the pattern in position before the operator and is supported upon a bracket $u$, uprising from the table A. *(John Royle and Sons, Paterson, N. J.)*

## THE ROYLE POWER PIANO MACHINE.

Cutting Jacquard cards by power is more conveniently and expeditiously than if done on a machine driven by an operator.

In the ordinary foot driven machines, the power necessary to force the die to perforate the card, is supplied by the operator. This demands considerable exertion of physical force and necessarily tends to limit the production of cards. Aside from this, there is very little to correct in the action and arrangement of the foot driven machine and it has therefore been kept in view to retain in the power machine, the salient features of the foot driven machine, the chief change being the introduction of mechanical power in the room of man power. This modification adds very sensibly to the value of the piano machine as a device for cutting Jacquard cards, as it entirely relieves the operator of the most fatiguing part of his duties.

The illustration clearly shows the construction and operation of this power piano card stamper.

A represents the cutter head, carrying a set of punches and keys of the usual pattern. This head is supported by a pair of guide rods B and B′, which extend down through the table and into sockets formed in the lug C at the base of the pedestal. These guide rods are connected with an eccentric D, on the drive shaft E, through which a reciprocating movement is imparted to the cutter head when the shaft is rotated. This shaft engages with the continuously driven pulley F through a clutch, which operates as follows: Fixed to rotate with the shaft E are two clutch shoes attached to supporting wings which permit the shoes to slide radially toward or away from the inner curved surface of the rim of the pulley F. These shoes are connected with a hub which rocks independently of the wings by means of toggle joints. Arms radiate from the hub and have their free ends connected by springs, the tension of which, when free to act, tends to press the shoes towards the rim of the pulley. The rotation of the hub, which is a positive and continuous movement, operates to release the clutch, suitable mechanism being provided for this purpose. Both movements, the fixing and releasing of the clutch, are effected by sliding a sleeve G, along the shaft. This sleeve is connected with the pedals H and H′ by shafts and levers so as to be instantaneously controllable by the operator. It will accordingly be apparent that when the pedal H′ is depressed, the clutch will be thrown into engagement with the pulley, which will, in turn, cause the main driving shaft to revolve, this motion being eventually transmitted through the cam D to the guide rod B, the reciprocating movement of which will cause the cutter head to rise and fall, thus cutting a row of holes in any card which may be in the die. By depressing the pedal H, the sleeve will be drawn back, the clutch released and the movement of the cutter head instantly stopped.

This application of power is the distinctive feature of this machine and constitutes its most important element of superiority over machines heretofore designed for cutting cards by hand. The action of the power is entirely independent of the punches; it is positively applied and cannot fail; and as both the setting and releasing of the clutch are independently controlled by pedals, the power can be interrupted after each row of holes has been cut or can be allowed to run continuously to the end of the card, the operator simply depressing the proper keys in unison with the movement of the cutter head.

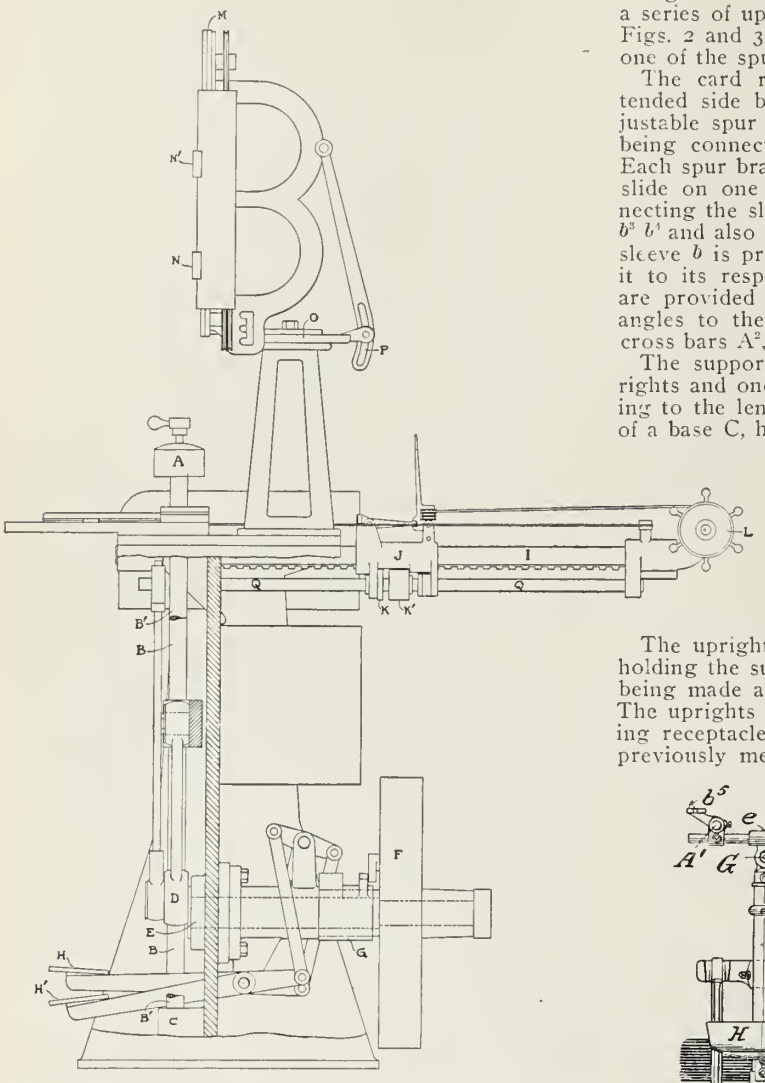
Aside from the application of power, there are other features of this machine which are worthy of mention. The feed carriage for the cards is of improved design, positive in its action and very carefully made. Its construction is as follows: A guide bar I, forms a support for the feed carriage J. This guide bar is of cylindrical shape and has a rack bar attached to its under side. The body of the carriage is connected with a rock shaft Q which moves in unison with the movement of the cutter head. On this rock shaft are fixed two sleeves, K and K′, which are provided with teeth fixed to engage with the rack bar, but so adjusted that when one is swung into position with the rack bar, the other will be out of engagement. A spring actuated pulley L, tends continually to draw the feed carriage backward, the movement only being interrupted by the action of the toothed sleeves above referred to. In action, the sidewise movement of the rock shaft throws first one and then the other sleeve into engagement with the rack bar, permitting the carriage to slip back one space with each movement. The rack bar is of milled steel, made perfectly true and accurate, and the action is absolutely positive and cannot fail or slip.

The carriage is provided with a suitable gripping dog for holding the cards, a quick and easy return action and is simple and reliable in every respect. The tension springs are adjustable so that the "pull" on the carriage can be lessened or renewed at will of the operator.

A number of improvements have been made in the reading board M. The rules N and N′ have two actions, a slow, step by step motion and a quick return movement. This saves time as it enables the operator to shift the rules over broad spaces in an inconsiderable space of time. The board can be moved horizontally forward along the line O or tilted forward or back by the arm P. A step by step index pointer is fixed on the board to operate in harmony with the feed mechanism, which serves to direct the eye of the operator to the place on the pattern which corresponds to the particular row in the card then being cut.

The chief aim, in designing this machine, has been to bring to the aid of the individual card cutter mechanical resources heretofore unavailable. The result of the successful introduction of this machine has been

that the value of the card cutter, individually, has been increased by enhancing his power of production, while




at the same time, the cost of sets of pattern cards has been sensibly reduced. *(John Royle and Sons, Paterson, N. J.)*

## ROYLE'S CARD LACING FRAME.

The objects are to provide a strong and durable lacing frame for Jacquard cards, in which the card rack can be adjusted to any height; also permitting adjustment of the two lines of spur brackets in either direction, to fit different sizes of cards.

Fig. 1 is an end view of the frame showing one of a series of uprights which support the card rack; and Figs. 2 and 3 are top and side views, respectively, of one of the spur brackets.

The card rack consists of two longitudinally extended side bars A, A', each having a series of adjustable spur brackets B mounted thereon, said bars being connected at intervals to the cross bars $A^2$. Each spur bracket B comprises a sleeve $b$, adapted to slide on one of the side bars A, A', a web $b'$ connecting the sleeve with a plate $b^2$, provided with arms $b^3$ $b^4$ and also with a peg $b^5$ for holding the cards. The sleeve $b$ is provided with a set screw $b^6$ for clamping it to its respective side bar. Some of the brackets are provided with a supplemental sleeve $b^7$, at right angles to the sleeve $b$ for receiving one end of the cross bars $A^2$, being held in position by a set screw $b^8$.

The support for the card rack comprises end uprights and one or more intermediate uprights according to the length of the rack. Each upright consists of a base C, having a socket $c$ adjustably secured to a post D, which can be adjusted to any height desired by the set screw $c'$ in the socket $c$. The rack is hinged to the uprights, so that it will remain level, by a sleeve E secured on the cross bar $A^2$ by means of a set screw $e$, a bolt G fastening it to the upright by means of a lug projecting from said hinge.

The uprights are provided with a receptacle I, for holding the surplus of the pile of cards, said receptacles being made adjustable to suit the size of cards used. The uprights are also provided with a bracket carrying receptacles H for holding the lacing twine. As previously mentioned the rods A, A', can be moved

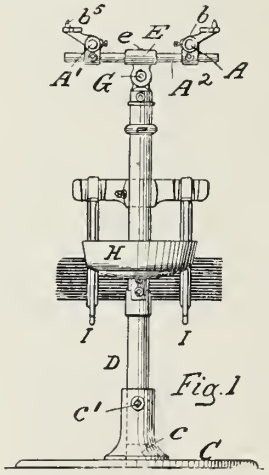



Fig. 1

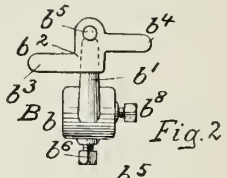



Fig. 2

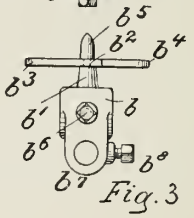


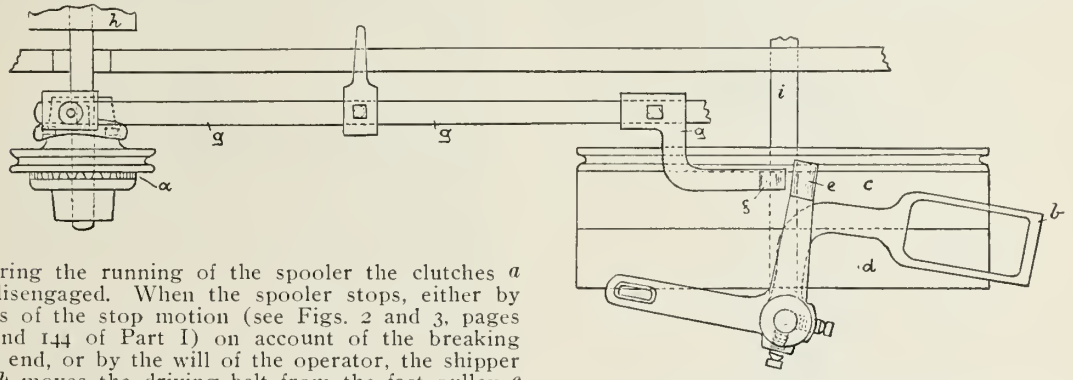

Fig. 3

on the cross bars $A^2$ and the spur brackets B adjusted on said rods A, A', thus permitting adjustment of all the parts to suit any size of card to be laced. *(John Royle and Sons, Paterson, N. J.)*

# SPOOLING, WINDING, WARPING AND BEAMING MACHINERY.

## CHECK MOTION FOR THE FURBUSH SPOOLER.

On pages 143-144 of "Textile Machinery Part I" a description of this spooler is given. Since then this check motion, as shown in the illustration in its top plan view, has been applied thereto; the advantages being the providing of a constant uniform tension to the yarn, no matter if spooler is running or stopped.




During the running of the spooler the clutches *a* are disengaged. When the spooler stops, either by means of the stop motion (see Figs. 2 and 3, pages 143 and 144 of Part I) on account of the breaking of an end, or by the will of the operator, the shipper fork *b* moves the driving belt from the fast pulley *c* onto the loose pulley *d*, the upper end of arm *e* as fast on the shipper lever moving at the same time away off an incline *f* which in turn by means of lever arrangement *g* operates the engagement of clutches *a*; the advantages being that the tension roll *h*, as running at a high speed (240 revolutions per minute) is stopped from overrunning the yarn, which would result in causing slack yarn between the tension roll *h* and the spool (not shown) on shaft *i*. This disadvantage is positively prevented by the engagement of said clutches *a*, as previously referred to, positively preventing overrunning of the tension roll *h*, thereby keeping a perfect even tension on the yarn.

This motion is also of advantage in starting the spooler, since the clutches remain engaged until the spool and tension roll have obtained their normal speed; the clutches by this time being disengaged, allow the tension roll to act, thus properly governing the tension of the yarn to be wound.

This motion can be used either with or without the stop motion previously referred to, and is of especial advantage when dealing with hard twisted yarn, in this instance positively preventing the snarling of the yarn. *(M. A. Furbush and Son Machine Co., Philadelphia, Pa., and Camden, N. J.)*

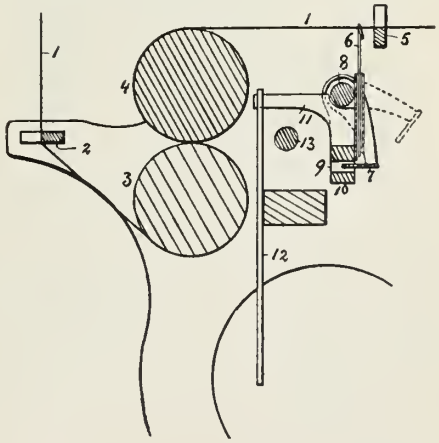
## STOP MOTION FOR THE ALTEMUS SPOOLER.

The object is to provide a stop motion which acts to immediately stop the spooler on breakage of a thread.

The illustration is a vertical section through a part of the machine, the stop motion mechanism being shown in its normal position.

The yarn 1 passes through the outer guide bar 2, under the lower roller 3, between the rollers 3 and 4, over the upper roller 4 and through the inner guide bar 5, onto the receiving roller. Upon each end of yarn between the roller 4 and guide bar 5 is located a detector 6, having its upper end in open eye form, the lower end being extended downward through a shield, and as long as the ends of the yarn remain intact, the detectors are held in elevated position.

When the machine is set in motion a toothed wheel (not shown) on the side frame is thrown in mesh with another toothed gear wheel on the shaft of the pulleys, the rotary movement of the same imparting an oscillatory movement to the blade 7 as secured to shaft 8. This movement will cause the forward end




of the blade 7 to enter the opening 9 in the latch frame 10 at each oscillation.

When a thread breaks, the detector 6 drops across the opening 9 and the blade 7 will come in contact with said detector, the continued forward movement

of the blade causing the frame 10 to tip on its support 8, thereby raising the latch 11 from engagement with the arm 12, said arm moving against a collar on the shaft 13, which moves said shaft endwise, in turn stopping the machine.

When it is necessary to lift the spool from contact with the winding drum (not shown in illustration), a spider wheel is rotated, which, through a train of gears secured on the side frame, operates to raise a cam which raises a lever connected to the standards of the spool, thus raising said spool from contact with its winding drum. *(W. W. Altemus and Son, Philadelphia, Pa.)*

## McTAGGART'S SPOOLER.

The object is to provide means for controlling the tension upon the threads so that any undue strain to a thread will cause it to break nearer the bobbin than to the spool, at the same time providing means for

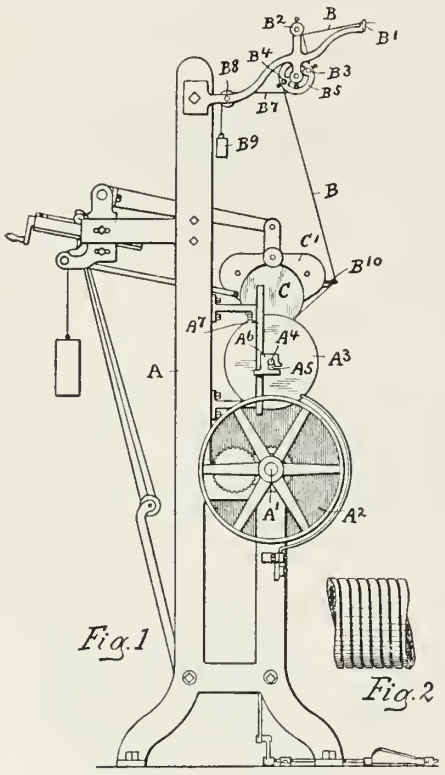



Fig. 1



Fig. 2

taking up a limited amount of slack of the yarn when so required; also winding the spool under pressure whereby the threads are wound more tightly and solidly upon said spool, thereby increasing the amount of yarn possible to be put on the spool, rendering its tension uniform during the process of dressing the warp.

Fig. 1 represents a side elevation of this spooler, and Fig. 2 a section of a portion of the pressure and guide roll showing the wavy grooves in which the threads run.

A denotes the frame of the machine in which the shaft $A^1$ is journaled and which carries a drum $A^2$, upon which the spool $A^3$ rests, being held in place by inserting its ends $A^4$ in the slot $A^5$ on the block $A^6$, which slides on the rod $A^7$ attached to the frame A. The threads B, as taken from the bobbins, are conducted through an overhead guide plate $B^1$ and carried once around the roll $B^2$, which is journaled to rotate freely so that the movement of the threads cause it to rotate with but little increase in tension to the yarn. The surface of this roll is roughened to resist the slipping of the threads, thus when any undue strain is placed on any of the threads the strain will come upon that part of said thread situated between the roll and the bobbins, thus causing it to break between the same, being a handier place for piecing the broken ends than when the break would have occurred nearer to the spool. The roughening of the surface of the roll $B^2$ also insures a most uniform feed for the yarn to the spool.

From roll $B^2$ the threads pass between two parallel rods $B^3$, $B^4$, held at their ends by disks $B^5$ (only one of which can be shown in illustration), one of which has attached to it the cord $B^7$, wound partially around the disk and carried over a roll $B^8$, having attached to it a weight $B^9$. While the threads are winding on the spool $A^3$ they exert sufficient tension to the rods $B^3$ $B^4$ to counterbalance the weight $B^9$, but in case the tension is released from the threads the weight will rotate the rods $B^3$, $B^4$, thus winding the slack of the threads on these rods, and which slack is taken up again at the starting of the machine.

Resting upon the yarn as wound on the beam is a metallic guide and pressure roll C, inserted between the heads of the spool and held by the claws $C^1$ in such manner that this roll C can be readily lifted from the spool when filled and a new spool has to be inserted, when the guide and pressure roll C is lowered again in operative position by devices clearly shown in the illustration.

The guiding of the threads is done by means of wavy grooves cut into this metallic pressure roll C, as clearly shown in illustration, Fig. 2; the threads after passing rods $B^3$ $B^4$ being threaded through eyes $B^{10}$ (one eye for each thread) and guided into the grooves in roller C, which lay said threads most uniform and compact on the spool. *(David McTaggart, Worcester, Mass.)*

## THE ALTEMUS UPRIGHT HOSIERY BOBBIN WINDING MACHINE.

In this machine the spindles are driven by friction, permitting a variable motion to be given to said spindles.

Fig. 1 is a perspective view of one end of this machine, and Fig. 2 is a front elevation, drawn on a larger scale compared to Fig. 1, of a new style of bobbin as used with advantage on this machine.

On a bar *a*, as mounted on the machine, is carried a bracket provided with a base plate *b*. Extending up from each end of this base plate *b* are two uprights *c*, *c'*, one being a guide for an arm *d*, the other being screw threaded, fitting into the other end of arm *d*. One end of the arm *d* supports, *i. e.*, guides, a whirl *e*, provided with a steel blade *f* which fits into the screw thread of the upright *c'*. This whirl *e* travels up and builds up the cop and when the latter is built, the spring plate *f* is released by the operator and the whirl allowed to drop. If by accident the whirl is allowed to drop too far, it simply turns on the base of the bobbin until it reaches its proper position to start winding again. A wire thread guide *g* is provided on the arm *d*, the former being bent down at its end, thus preventing the thread from slipping out of said eye.

The bottom of the spindle *h* is provided with a friction disk *i* which bears on a friction wheel *j*, the same being driven through gear *k* and gear wheel *l*, the shaft *p* of said gear wheel being provided at one

end with the fast and loose pulleys, and at the other end with a grooved cam *m*, in which fits a stud on one end of an adjustable arm *n*, the other end of said arm being provided with a stud which fits into a

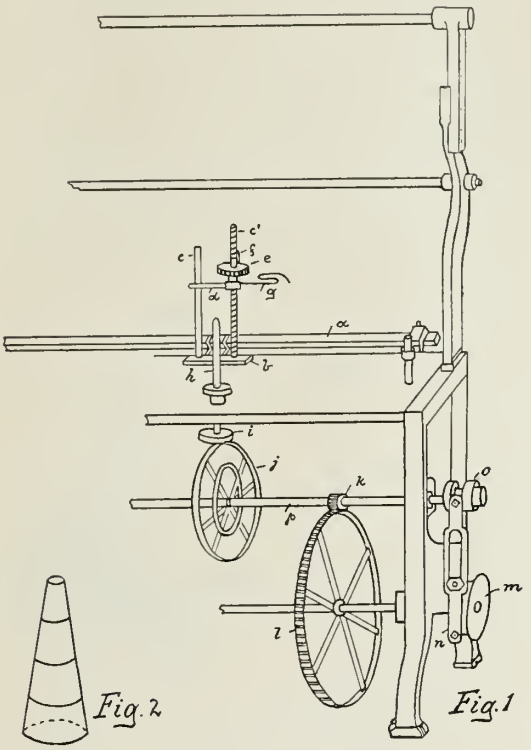


Fig. 2

Fig. 1

grooved collar *o*, fast onto the friction wheel shaft *p*, By this arrangement it will be seen that the friction wheel *j* will constantly change its position with relation to the friction disk *i* and thus produce the characteristic variable motion to the spindle as the cop is built.

The bobbin used on this machine (see Fig. 2) is of a new construction, being hollow, conical in shape and made of stiff paper, which makes a cheap, light, and durable bobbin, being superior over the wooden bobbins as formerly used. A yarn stripper is also used with this machine. *(W. W. Altemus and Son, Philadelphia, Pa.)*

## HUSE'S BOBBIN WINDING MACHINE.

This machine is more especially adapted to wind bobbins having a tapering base, taking the yarn either from a skein or a spindle.

Fig. 1 is a front elevation, and Fig. 2 a left hand end elevation of (part) of this machine.

A indicates the framework, A′ the main shaft which is provided with a series of friction devices *a a′*, arranged side by side, those *a′* engaging friction disks $a^3$ at the lower ends of spindles $a^5$, while those marked *a* engage friction disks $a^2$ at the lower ends of spindles $a^4$. These spindles have their bearings in like yokes *b*, secured in the framework, the said spindles occupying reversely inclined positions and lying side by side as shown in Fig. 2, so as to be rotated by the series of drivers *a a′* on one and the same shaft.

The shaft A′ has mounted loosely upon it, between collars *e e′*, a collar $c^2$, having attached to it a link $c^3$, connected with a lever $c^4$, pivoted at $c^5$ and having at its lower end a stud (shown by dotted lines at $c^6$) which enters a diagonal or inclined groove $c^7$ in one end of an arm $c^8$, fixed to a rock shaft B, the motion of said shaft turning the lever $c^4$ and sliding the drivers under the disks to rotate them at a slower or faster speed—the nearer the drivers to the center of the disk the faster the speed, and *vice versa*. The main shaft has a belt pulley *d*, provided with a belt *d′*, which is extended over a pulley $d^2$, loose on a short shaft B′ and having at its hub a pinion $d^3$, which engages a toothed gear $d^4$, fast on a short shaft $d^5$ in a stand $d^6$, said shaft having at its opposite end a pinion $d^7$, which in turn engages a toothed gear $d^8$, fast on the shaft B′, thus rotating said shaft and its attached gein cam $B^2$ at a slow speed, causing it to act on a roller *e* on a stud $e^x$ of a lever *e′*, fast on the rock shaft B, causing the said rock shaft in its movement to also operate the arm $B^3$, having adjustably attached to it a roller $B^4$, which acts on and rolls over the shoe $B^5$, attached to lifting rods $B^6$, having at their upper ends an arm $B^7$, which carries an upright rod *f*, two or more such rods carrying at their upper ends a bar *f′*, which latter carries the blocks $f^2$, on which are erected a screw $f^3$ and a guide $f^4$. The screws are surrounded by a yoke $f^5$, and one end of the yoke is extended to embrace the guide $f^4$ loosely, and between the arms of the said yoke the said screw is surrounded by a tapering pressure roller *p*, having its hub adapted to engage the threads of the screw to gradually raise it on the screw as the bobbin is being filled. The yoke also supports an arm *g*, having a yarn supporting roll

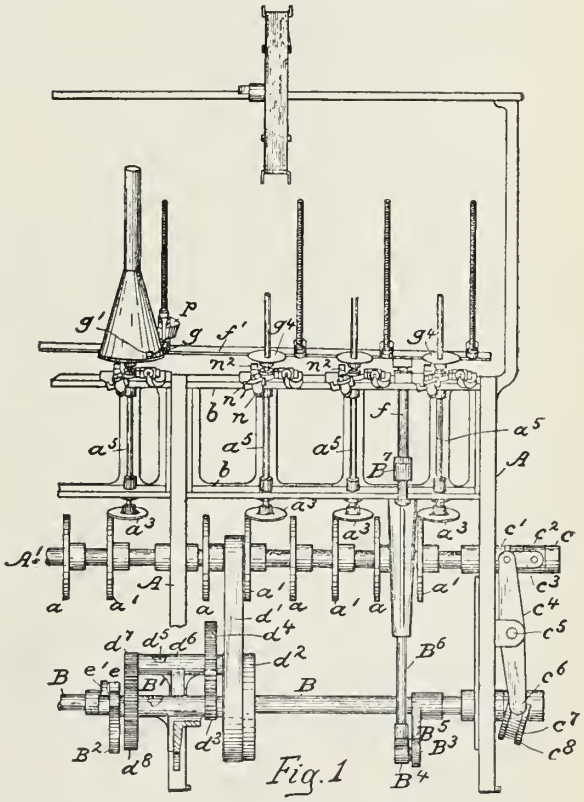


Fig. 1

*g′*. The yarn to be wound may be taken from a reel *h* or from a cop *h′*.

The yarn when taken from the reel passes through a slotted porcelain guide eye held in a fork attached to an arm $h^2$ by a screw, the slot of the guide being directed downwardly and thence the yarn is led be-

tween metal clearer plates confined adjustably by set screws entering a projection from the arm $h^2$, and thence the yarn goes to and about a tension device or wheel $h^3$, regulated by a suitable spring and nut, said

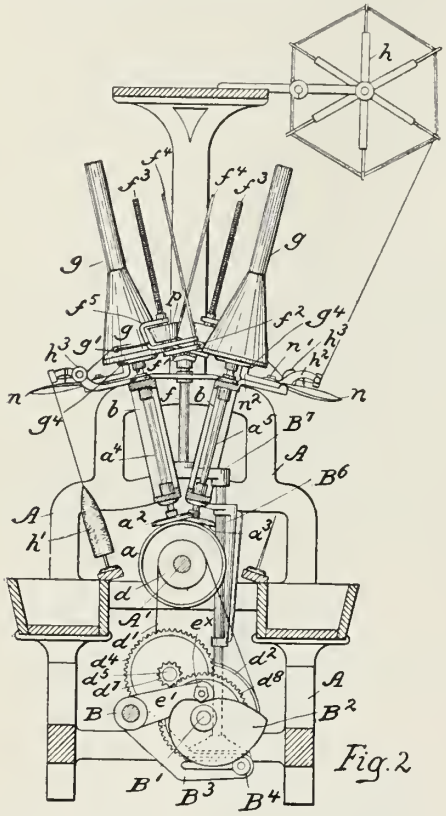


Fig. 2

arm being attached to the yoke $b$. From the tension device the yarn goes over roller $g'$ connected with the yoke $f^5$, and is connected with the bobbin $g$, the latter resting on the friction plate $g^4$.

When the yarn is to be taken from a cop, as indicated by $h'$ in Fig. 2, the position of the guide eye is reversed.

To stop the rotation of the spindles when desired there are provided a series of brake levers $n$, mounted on a stud screw $n'$, tipped a little from true vertical position, so that the upturned end $n^2$ of said lever in its movement by hand in one direction acts as a brake on the disk $g^4$, carried by the spindle; its movement in the opposite direction releases the disk and leaves the spindle free to be rotated.

The pressure roller $p$ in operation rises and falls, and at the same time by contact with the yarn being wound it is gradually fed upward on the screw as required to properly shape the base of the wound mass of yarn. The advantages of this winder are positive, uniform tension for the yarn when wound onto the bobbin and the cleaning of the yarn of all bunches before arriving at the tension devices. *(Warren D. Huse, Laconia, N. H.)*

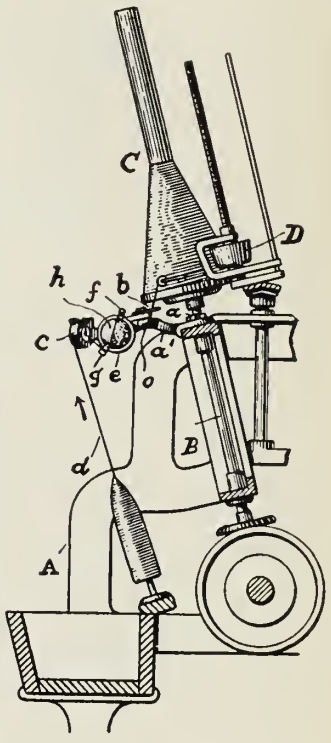
## THREAD TENSION DEVICE FOR BOBBIN WINDERS.

The illustration shows part of a bobbin winding machine having this tension device applied.

A indicates the framework, B the bobbin carrying spindle, C the bobbin carried thereby, and D the roller bearing on the thread wound on the bobbin, it being raised automatically as the bobbin is filled with thread.

The fixed frame A has attached to it by a screw $a$ an arm $a'$, which has connected to it by a screw a thread clearer $b$, composed of two adjustable plates or blades, and the arm also has attached to it by a screw a thread guide $c$, open at one side for the reception of the thread $d$. The thread previously passing through the clearer passes under an antifriction roll $o$.

Between the thread guide and the clearer, the arm $a'$ is provided with a hole in which is inserted the threaded shank of a thumb screw, said shank receiving upon it at one side of said arm an annular base $e$, having attached to it thread guides $f$, $g$. This base $e$ has a concavity at one side, in which is placed a metallic button covered with a jacket $h$, composed of some woven or fibrous material, to exert friction upon the thread, said button being laid into the concaved side of the base, a threaded portion at the center of the button receiving the threaded shank of the thumb screw, the rotation of which forces the covered button closely into the concaved face of the base, and when the thumb screw is turned up tight, holds the base and button firmly in any desired position, so that the thread guides $f$ and $g$ may be held normally in any position with relation to the opening in the thread guide and to the surface of the thread guide $o$, rotation of said base and its thread guides $f$, $g$, causing the thread to be thrown out of line with relation to the thread guides $c$, $o$, thus wrapping the thread more or less about the guides $f$, $g$, the greater the angle in the thread passing between the thread guide $e$ to the clearer and thread guide $o$, the greater the tension on the thread, and *vice versa*. This tension device also acts as a clearer to the thread. *(Warren D. Huse, Laconia, N. H.)*



## McCAUSLAND'S COP WINDER.

The objects of this winder are to avoid slipping of the yarn upon the surface of the tube, also preventing the entangling of the yarn, by the outer layers sinking into or forcing the inner layers of the yarn out of proper position.

Fig. 1 shows an elevation of the driving mechanism made in one form in which a conical roller is used for the propelling mechanism. Fig. 2 shows in elevation another form in which a cylindrical roller is employed. Fig. 3 shows in plan another form in which a flat surface is employed. Fig. 4 shows a partially sectional view in which a hollow conical propelling

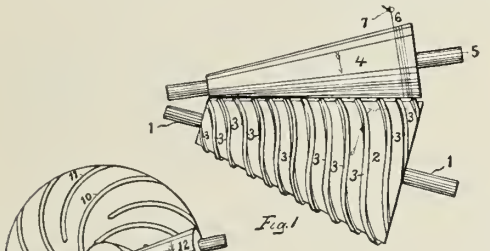
surface is employed, and Figs. 5, 6, 7, and 8 show the helical ridges as applied to winding cops upon cylindric or slightly tapering bobbins in a conical cup, respectively in elevation in lengthwise section and of a cup shown separately in section and in end view.

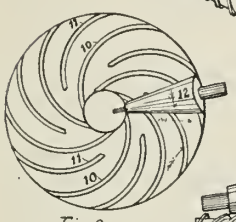
1 represents the arbor of the driving surface. In Fig. 1 this is a cone marked 2, the surface of which is threaded or formed with ridges 3 in helical direction, which ridges 3, contacting with the surface of the yarn 6 on the cop tube 4, propel it in rotation, and as they propel it, press the yarn 6 toward the greater end of the cop tube. The direction of the rotation is indicated in the illustrations by arrows drawn in full lines and the direction of the resultant thrust is indicated by arrows in dotted lines. The cop tube 4 is directed by spindle 5 so that as the yarn increases the diameter of the cop it raises the cop, and the yarn 6 is guided to the cop tube by traversing eye 7, which reciprocates so as to place the yarn in the desired circles or layers.

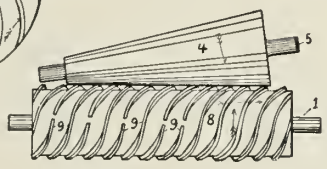
As shown in Fig. 2, instead of a conical surface, a cylinder 8 is used to propel it, having threads or segments of threads 9 formed upon it, which act in like manner as explained in relation to the form shown in Fig. 1.

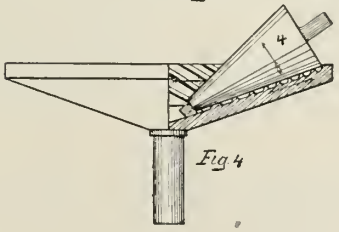
In Fig. 3 the propelling surface is a disk which has spiral ridges formed in evolute curves, which may be either continuous or interrupted, as shown at 10 and 11, the pitch or inclination being such as to throw outwardly toward the greater end of the cop tube 12.

In Fig. 4 the propelling surface is a dished or hollow one and has similar threaded ridges directed in



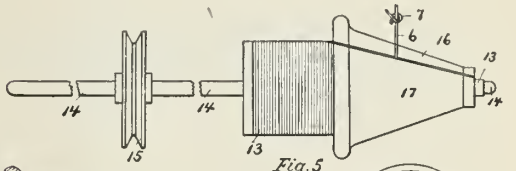



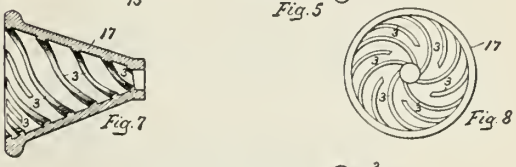



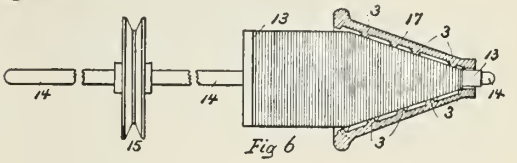




helical and evolute curves, so as to press the yarn toward the greater end of the cop tube.

In the form shown in Figs. 5, 6, 7, and 8, the bobbin 13 is placed on and rotated by a spindle 14, driven by a whirl 15. The bobbin 13 is cylindrical in form or but very slightly tapering, and the yarn 6 is guided by a reciprocating eye 7 through a slit 16 in a conical cup 17. In the interior of the cup 17 are helical ridges 3, which press the yarn 6 as it winds in the bobbin 13 toward the greater end of the cup 17 and insures the laying of the several layers of yarn firmly upon each other. The spindle 14 is susceptible of endwise motion, and as the yarn winds upon the bobbin 13 in




conical layers it presses the cop and bobbin outward from the cup 17. In this form the spiral or helical ridges, although not propelling the yarn or cop as it forms on the bobbin, act as guides to smooth and press the several layers of yarn upon each other, as the ridges in the forms shown in Figs. 1, 2, 3, and 4. *(William J. McCausland, Camden, N. J.)*

## A COMBINED TWISTER AND COP WINDER.

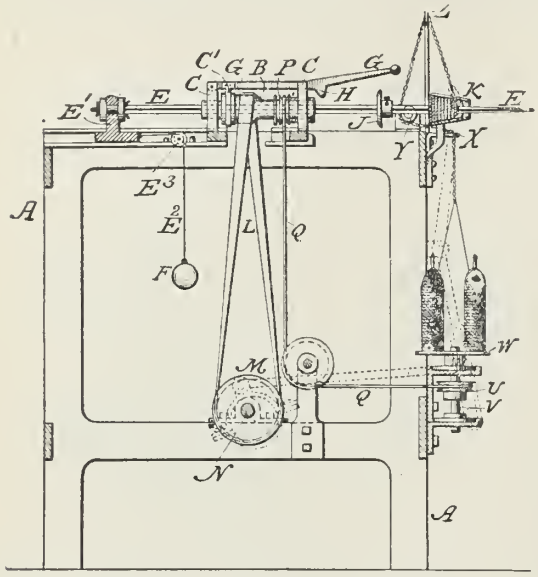
The purpose of the machine is to do the doubling and twisting of the yarn and the winding of the latter into cops, ready for the shuttle, in one operation. It more particularly refers to ingrain carpet yarns.

The illustration shows a partial side elevation and partial vertical section of this machine, the operation of which is as follows:—Power is transmitted by means of belt L, from the shaft N, and its pulley M to the pulley B, and thus in turn to spindle E, which is squared at that portion which, during the operation of the machine, comes in contact with the inside (and which is correspondingly squared) of the pulley B. This construction of spindle and inside of pulley permits a twofold operation to the spindle, viz.: Its turning by means of the pulley, at the same time permitting longitudinal sliding in the pulley as the cop builds itself, and thus pushes the spindle gradually more and more to the rear.

G designates a hand lever, which is connected with the carriage C and is provided with the yoke $C^1$, which freely embraces the pulley B, said lever having near its handle end the depending shoulder H, which is adapted to be engaged at the proper time by the collar J on the spindle E for stopping the rotation of the spindle by pushing belt L from the large diameter to the smaller diameter on pulley B, *i. e.*, the belt stops to transmit power.

The rear end of the spindle E is journaled in the movable bearings $E^1$, supported on the frame A, and has connected to it the cord $E^2$, which is passed around the guide pulley $E^3$, the lower end of the cord having attached to it the weight F, which exercises a constant pressure to the bearing $E^1$ and in turn to the spindle towards the front of the machine. Pulley B is of a tube shape, having two diameters, *i. e.*, a

greater and a smaller diameter, having at its other end another pulley P, which, in turn, transmits motion through belt Q to the pulley U and through shaft V to the flier W whereby the yarn on the latter is




doubled and twisted, in which condition it is directed by the eye X and pulleys Y, Z to the spindle upon which it is wound and formed into a cop thereon, it being noticed that the belt L passes around the greater diameter of the pulley B, and is thus held in proper taut condition to operate the same.

As the cop is formed into a cone and its diameter is accordingly increased, it presses against a hollow cone, *i. e.*, the guide K, and imparts longitudinal motion to the spindle E. When the cop is finished, the collar J reaches the shoulder H, bears against the same and moves it and the carriage in the direction that the spindle is traversing, in turn guiding belt L as running rapidly on the large diameter of the pulley B down the inclined surface between the two diameters of said pulley until it reaches the narrow portion of the pulley, when it becomes loose and the doubling and twisting and cop forming operations cease.

The cop is then removed from the spindle, and the latter, owing to the weight F, is returned to its normal position and thus the operation is resumed. *(John F. Lodge, Philadelphia, Pa.)*

## ATHERTON'S WINDER AND QUILLER.

This refers to a so called "individual" quiller, capable of being readily attached to and detached from the frames of looms of different make and construction, said quiller being provided with an automatic stop motion operating when the cop or quill is filled, without stopping the motion of the loom to which it is attached.

Fig. 1 is a front elevation of the quiller and its supporting frame attached to a portion of a loom frame, also showing the means for transmitting motion from the loom to the quiller, Fig. 2 an enlarged side elevation of the quiller and of its supporting frame, Fig. 3 is a detail view, partly in section of a portion of the thread guide carrier supporting and operating mechanism.

*a* represents the frame of the quiller, having a forwardly projecting arm *b*, supporting the hollow vertical shaft *e*, penetrated by the spindle *d*, which receives at its upper portion *d'* a cop or quill. On the stationary shaft *e* is revolubly mounted a sleeve whirl *e*, having its upper portion conical shaped, as at *e'*, and bearing against a leather washer $e^2$ inserted and secured within the cylindrical chamber $e^3$, arranged in the lower portion of a sleeve $e^4$, also revolubly mounted on the shaft *e* and provided at its top portion with a circular disk $e^5$, carrying the upwardly projecting rods $e^6$, $e^7$, which latter support the thread guide carrier $e^8$. On the sleeve $e^4$ is arranged a worm $e^9$, normally meshing with a gear wheel *f*, revolubly mounted on a horizontal stub shaft, secured to and projecting from the frame *a*.

On the hub $f^2$ of the gear wheel *f* is mounted a three point cam $f^3$, adapted to operate an antifriction roller $f^4$, arranged at the free end of one arm of the angle lever $f^5$, having an adjustable fulcrum $f^6$ in the frame *a* and provided in its other arm $f^7$ with an elongated slot $f^8$, which is penetrated by a pin $f^9$, carried by the slotted block $f^{10}$, which latter is adjustably arranged by means of a set screw $f^{11}$, on the downwardly pro-

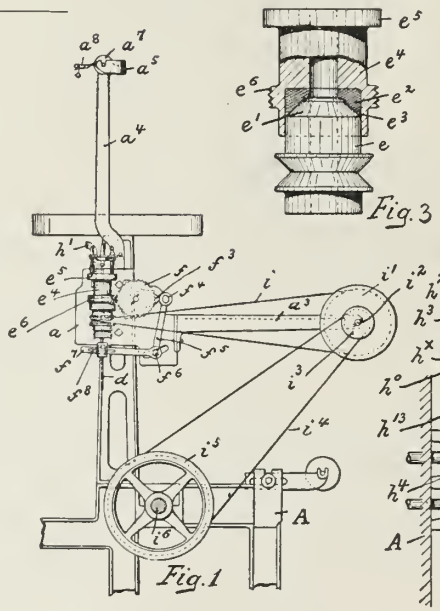



Fig. 1




Fig. 3

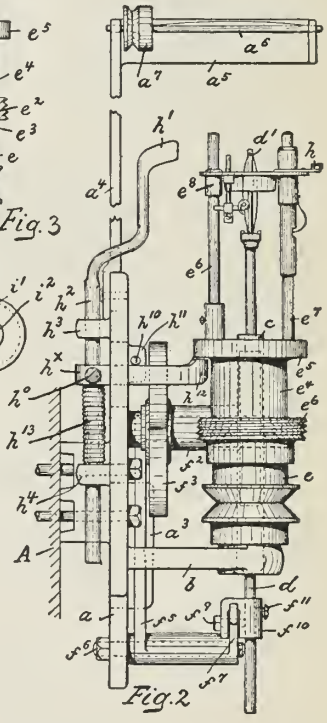



Fig. 2

jecting portion of the spindle *d*. The projecting lug or hammer *h* of the thread guide carrier $e^8$ is adapted to engage when the cop or quill is filled, the substantially horizontal portion $h^1$ of a crank shaft $h^2$, slidingly and revolubly mounted in lugs $h^3$ and $h^4$, projecting horizontally from the rear of the frame *a*. On the crank shaft $h^2$ is adjustably secured by means of a set screw $h^9$, a horizontal arm $h^x$ penetrating an opening in the frame *a* and extending with its free end below the circular disk $e^5$ of the worm carrying sleeve $e^4$.

When in normal position, said arm bears against

the under side of a pin or stop $h^{10}$, projecting from a lug $h^{11}$ on the frame $a$, but is adapted to clear said pin whenever the crank shaft $h^2$ is operated. The free end of the arm $h^x$ is curved eccentric to its fulcrum (crank shaft $h^2$), so that when the arm $h^x$ is thrown out of engagement with the pin $h^{10}$ the said eccentric or curved portion $h^{12}$ bears against the outer periphery of the sleeve $e^4$ and creates sufficient friction to almost instantly stop the rotation of said sleeve and accordingly of the thread guide carrier.

A spiral spring $h^{13}$, normally under compression, is arranged on the crank shaft $h^2$ and bears with one end against the lug $h^4$ and with its other end against the said horizontal arm $h^x$, thereby keeping said arm in contact or engagement with the projecting pin $h^{10}$.

The sleeve whirl $e$ is operated through the endless belt $i$, passing over the grooved pulley $i'$, mounted on an auxiliary shaft $i^2$, secured to a horizontal bracket $a^3$, projecting from the frame $a$. With the grooved pulley $i'$ is connected a smaller grooved pulley $i^3$, operated through the endless belt $i^4$, passing over a grooved pulley $i^5$, which latter is secured on a revolving shaft $i^6$ in the loom A.

To the upwardly projecting bracket $a^4$ of the frame $a$ is secured an auxiliary bracket $a^5$, furnishing bearings for a horizontal spindle $a^6$, adapted to receive the filling delivery bobbin, and is provided with a grooved pulley $a^7$ in frictional contact with the weighted fulcrumed lever $a^8$. When a new cop or quill is placed on the spindle $d$, the crank shaft $h^2$ is returned to its normal position.

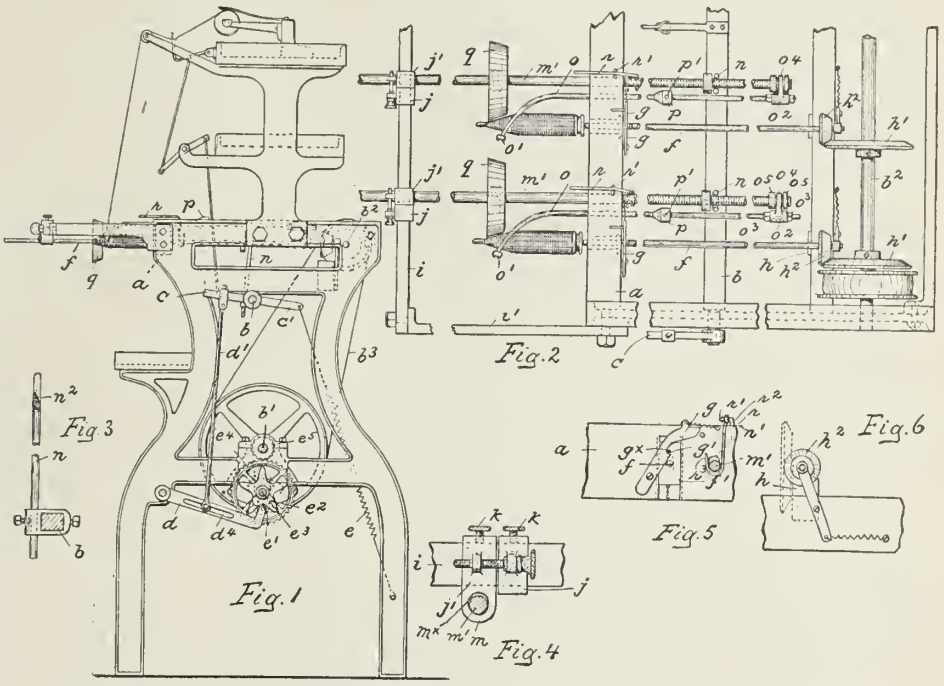
To insure a good frictional contact between the disk carrying sleeve $e^4$ and sleeve whirl $e$, the teeth on the gear $f$ and the thread on the worm $e^6$ are cut left handed, thus exerting a downward pressure upon the said worm and accordingly on the sleeve $e^4$. The raising and lowering of the spindle $d$ is accomplished by the fulcrumed angle lever $f^5$, which in turn is operated by the three point cam $f^3$. *(Robert Atherton, Paterson, N. J.)*

## ASHLEY'S QUILLING MACHINE.

The construction refers more particularly to machines known as "horizontal" or "French" winders.

Fig. 1 is a view in side elevation of this winding machine, Fig. 2 is a top plan view, sligthly enlarged, (compared to Fig. 1,) of a portion of one end of this winding machine; and Figs. 3, 4, 5 and 6 are views in detail required to be shown to more clearly understand the construction and operation of this machine.

The shaft $b'$ is the main driving shaft and rotates the shaft $b^2$ by belt $b^3$ and thus through two friction cones $h'$ $h^2$ the spindles $f$, one set of friction cones being used for each spindle. The shaft $b'$ also rocks the squared shaft $b$ through rod $d'$, attached at one end to the arm $c$ and at the other end to an arm $d$ by means of a slot $d^4$, said arm $d$ having an upturned end carrying a roller $e'$, which engages a star cam $e^2$, journaled on a stub shaft $e^3$, and is rigidly connected to a gear $e^4$ which engages a pinion gear $e^5$ mounted on the shaft $b'$. Spring $c$ as connected to arm $c'$ of the lever $c$ holds the roller $e'$ securely against the star wheel.




$i$ designates a horizontal bar extended across the front of the frame, being supported by two arms $i'$ bolted to the frame. This bar $i$ penetrates blocks $j$ $j'$ each of which carries a set screw $k$ which is adapted to act against said bar. The block $j'$ is provided with a downwardly extending projection $m$ in an opening $m^x$, in which a worm shaft $m'$ has bearings, said opening being slightly larger than said worm shaft and the threaded portion of said shaft being received by the bifurcated part of a fork $n$, projecting upwardly from the squared shaft $b$. A knife edge $n^2$ is set in this bifurcated portion which engages the threaded portion of the worm shaft $m'$.

The rocking movement imparted to the shaft $b$ produces vibrations of the fork $n$, and thus imparts longitudinal reciprocation of the worm shaft $m'$ and the thread guides connected thereto, thus forming the layers of the cop. The thread guide consists of an arm $o$, which penetrates a rail $a$ and is connected at its rear end to the shaft $m'$, its front end being curved over the spindle $f$, and is provided with an eyelet $o'$. The connection between the worm shaft $m'$ and the arm $o$ consists of a sleeve $o^2$, secured on said arm by nuts $o^3$, an integral projection $o^4$ being disposed between two collars $o^5$ on the worm shaft. The arm $o$ carries a cone $p$, mounted thereon by means of a set screw $p'$, said cone being adapted to engage the free end of a spring actuated dog $g$ so as to move the latter and throw it out of engagement with the pin $g^x$.

The worm shaft $m'$ carries a beveled wheel $q$ which bears against the cone of the cop being formed thus producing firm winding, also turning of the worm

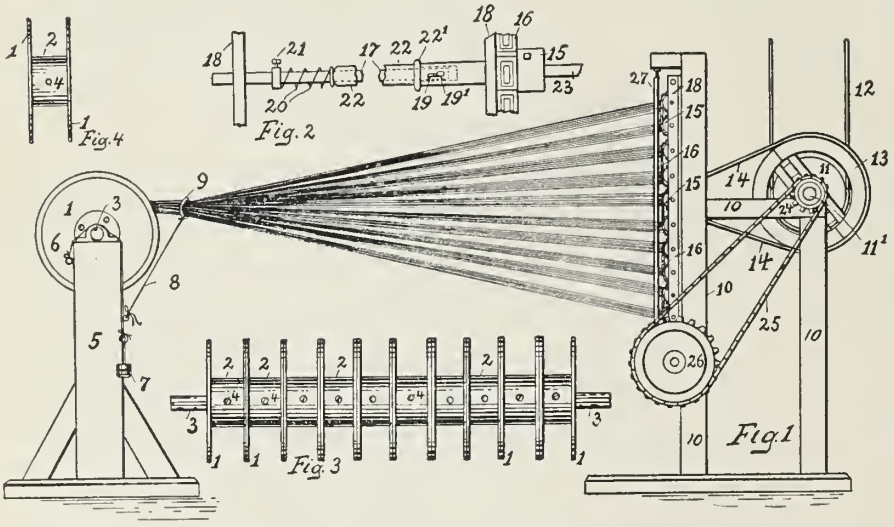
shaft $m'$, feeding the latter forwardly in the fork $n$. When a cop has been formed the cone $p$ will act against the spring actuated dog $g$, so as to disengage the same from the plate $f'$, thus permitting the latter and the spindle it carries to drop, the spindle acting against the inclined edge of a plate $h$, thereby causing its rear end to move laterally thus destroying the contact of the friction cones $h'$ $h^2$, in turn stopping the rotation of the spindles.

In order to reset this portion of the machine the free end of the spindle $f$ is raised until the pin $g^x$ engages the recess $g'$; and in order to reset the thread guiding mechanism a lever $r$, fulcrumed upon a pintle $r'$ projecting laterally from a screw $r^2$ whose rear ends project downwardly being formed into a hook $r^3$ extending beneath the shaft $m'$ is depressed, thereby raising the worm shaft out of engagement with the fork $n$, permitting the pushing back of the worm shaft in position for starting to wind a new cop. *(Sipp Electric and Machine Co., Paterson, N. J.)*

## RAISTRICK'S SPOOLING MACHINE.

The object is to do away with dyeing worsted or cotton yarn "in the hank" by dyeing it "in the warp." After dyeing the yarn "in the warp" the same is wound on a sectional yarn beam, each section (and each of which can hold a different colored yarn) in turn being subjected for rewinding to the spooling machine.

Fig. 1 is a side view of the machine and Fig. 2 a detail view of connection of spindle and holder or driving mechanism, with the center of the spindle broken out in order to show both ends of spindle; Fig. 3 is a detail view of the sectional yarn beam, showing divisions and set screws, and Fig. 4 shows one of the divisions constituting the sectional yarn beam.




This sectional yarn beam may consist of any number (as the case or work may require) of individual small yarn beams as shown in Fig. 4, having two flanges 1, and the barrel 2, which is hollow to permit shaft 3 to be run through, and is fastened to said shaft by means of countersunk set screws 4. 5 is the yarn beam stand, having a friction strap fastened to it at 6 and weighted at 7. 8 is a cord attached to the stand and holding guide ring 9 for keeping the warp yarn from rubbing against the flanges of the yarn beams.

From the sectional yarn beam the yarn passes to the spooling machine consisting of a frame 10 carrying driving shaft 11′ having driving pulley 11 driven by belt 12 from any convenient motor. 13 and 14 are respectively pulley and belt which transmit power to the sprocket wheels 15 and which are connected by sprocket chains 16 and turn the spindles which carry the bobbins or spools. 24 is a sprocket wheel driving by means of sprocket chain 25 sprocket wheel 26, which in turn operates the bobbin building device. Short ends of shaft 23 extend out each side of sprocket wheels 15 (see to the right in Fig. 2), having their bearings in the metal projections 18 which bolt onto frame 10. The short ends 23 are hollow, as shown in Fig. 2, to receive the points of the spindles 17, and the keys 19 pass through these holders and the points of the spindles through opening 19′ in spindle and holder, which opening 19′ is enlarged at one end, and spring 20 presses bobbins 22 against the end of holder 22′, drawing key 19 into the narrow part of opening 19′. Compression of spring 20 by pressing the bobbins toward it makes it easy to withdraw key 19 and remove the spindle with its load of bobbins.

Set clamp 21 allows of the adjustment of spring 20, so that the right amount of friction is maintained between the spools in order that they will turn with the spindles when there is no impediment, but will turn on the spindle when a thread is blocked, and thus save the breaking of the thread.

27 is a movable frame in front of the bobbins, to which are adjusted several pairs of guide rods for guiding the threads and building the bobbins. This frame is vibrated to and fro by means of a cam placed below it, and as the bobbins gradually fill up, the frame gradually moves more and more towards the point end of the bobbin and away from the bottom of said bobbin. This motion gradually builds up the bobbin and is produced by means of a spiral screw attachment, which can be changed to suit any count of yarn or size of bobbin wanted. *(John Raistrick, Jamestown, N. Y.)*

## KINK PREVENTER AND SIGNAL FOR SILK TWISTERS.

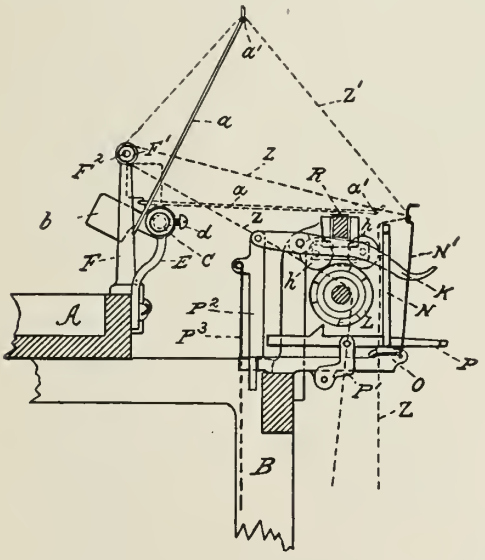
The illustration is a vertical cross section of a portion of a twisting machine, showing this kink preventer and signal applied thereto.

B is the frame of a twisting machine. A is a bobbin supply box, and F a stand mounted on this box, having a guide F′ mounted thereon at $F^2$. E is another stand mounted on the box and having a pin C held by the screw $d$, said pin having a screw thread

on a portion of its surface, upon which is mounted (loosely connected to it) the weight *b*, having a screw threaded hole. When the weight turns upon the pin, it is caused to move laterally by means of its thread meshing in the thread on the pin. Secured to the weight *b* is the lever *a*, made of wire, and bent as shown at *a'*.

O indicates the faller stand, and P the rock lever, upon which the faller N' falls upon the breakage of a thread; said rock lever P swings in a swing yoke P', mounted on the faller stand. L is a driving roller having mortises to engage with the tooth on the rock lever and operate the stop motion on the breakage of a thread. $P^2$ is a latch that is automatically released on the breakage of a thread and falls, with the link $P^3$, to operate to stop mechanism. N is an upright, mounted on the faller stand, for the fallers to rest against when they are held up by the thread, and K is a starting lever, the pressing of the outer end of which will start the mechanism after the threads have been repaired. R is a cross section of a bar carrying the feed rollers *h*.

When the parts are in operation, the lever *a* is placed in the position shown by dotted lines in illustration and the center of gravity of the weight *b* is about over the center of the pin C. As a result the weight of the lever *a* is sufficient to keep it in the position shown by the dotted lines. The threads pass around the fallers N', over the guides F', and down to the feed rollers. A thread passing in this course is shown at Z. The part *a'* of the lever *a* rests beneath the threads at the point where they leave the fallers to travel toward the guide F'. Lever *a* is an idle lever, which performs no function when the parts are running, but is ready to do its work when the stop




motion acts. The lever is out of contact with the threads when the parts are in motion, the forward end of it being made to rest upon the bar R.

In stopping the mechanism for doffing, the operator puts the stop motion in operation by pressing down the rock lever with his hand. When the stop motion operates, the outer end of the lever K rises and the bar R is thrown upward and thrusts the lever *a*, causing the weight *b* to overbalance and throw the lever *a* upward to the position shown in full lines in illustration, the threads being carried upward by the wire, as shown at Z'.

When a thread breaks or one of the supply bobbins becomes empty, the stop motion operates, and the lever *a* rises in the same manner and acts as a signal to the operator. In machines where the lever is to be used as a signal only the part *a'* of the lever can be dispensed with.

When the parts are in a running position, there is a space between the weight *b* and the hub on the stand E. When the weight *b* becomes overbalanced and turns on the screw thread part of pin C, the weight travels laterally on the pin C until there is no space between weight *b* and the hub on the stand E, *i. e.*, the weight has come in contact with said hub on the stand E. By means of such contact the upward motion of the wire is arrested, while the weight wedges against the surface of the hub on the stand E in such a manner that there is no rebound when the upward stroke of the wire is ended. The width of the space between weight *b* and the hub on the stand E can be regulated by loosening the screw *d* and moving the pin C to such position as is desired.

In twisting silk threads, in which a large amount of twist has to be put into the threads, if for any cause the twisting operation is interrupted, the threads become slack, and the twist in the threads usually causes them to form into kinks, which if not removed form serious imperfections in the finished thread. Through the lever *a* being thrown upward and the part *a'* carrying the threads upward, as shown, a considerable quantity of untwisted thread is drawn from the supply bobbins. The twist in the thread is thereby allowed to spread through this untwisted thread, and the twist through spreading becomes too weak to form kinks. If the lever *a* rebounded when it had reached the end of its upward stroke kinks would sometimes form in the threads; but through the weight *b* traveling laterally and wedging against the stand E, as before described, this rebound is prevented and the threads between the fallers and the part *a'* of the wire are held taut, not being allowed to become slack for an instant, and through there being no slackness, kinks cannot form. The lever *a* on becoming elevated, as shown in the illustration, can be seen from a considerable distance, and thereby acts as a signal to the operator that a thread has broken or that a bobbin has become empty. *(Joseph E. Tyman, Paterson, N. J.)*

## THE SMITH WARP DRESSER.

The construction of this machine permits a variable speed, *i. e.*, that the speed of the same can be readily decreased, so that piecing of a broken thread or threads can be effected without actually stopping the machine. The extent of immersion of the lower sizing roll in the sizing composition can be regulated and the caking or hardening of the sizing composition upon said lower sizing roll prevented when the machine is not in operation.

Fig. 1 is a perspective view of this dresser; Fig. 2 a sectional plan view, on an enlarged scale, (compared to Fig. 1) of part of the driving mechanism; Fig. 3 a longitudinal section of part of the machine illustrating the sizing rolls, the size trough, and part of the mechanism for raising and lowering the latter; and Fig. 4 is a perspective view of part of the shipping mechanism for the driving belt and transmitting clutch.

A A' represent the hollow steam heated drying rolls, having hollow journals adapted to bearings on the main frame and which are driven by suitable gearing; B B' are the sizing rolls, the lower roll being mounted in bearings on the fixed frame and the upper roll having bearings acted upon by weighted levers *a*, so that it is pressed firmly against the lower roll.

D is the trough, containing the sizing liquid, this trough, when the machine is in operation, being so disposed in respect to the lower sizing roll B′ that the

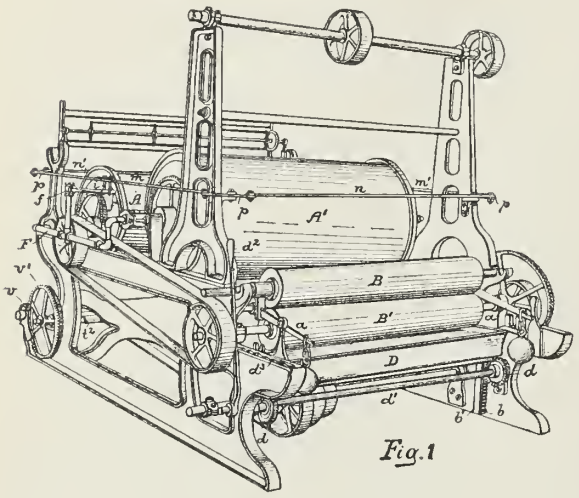


Fig.1

latter is partially submerged in the sizing liquid and conveys the same to the threads passing between the two sizing rolls, the sized threads then passing over the drying rolls A A.

When the size trough occupies a fixed position, the sizing forms a thick coating upon the submerged portion of the lower sizing roll when the machine is not in operation. Hence when the machine is again started, an excess of the sizing composition is thus more or less applied to the warp threads, thereby detracting from the uniformity of appearance of the latter and frequently causing the breaking of the warps in weaving, owing to the catching of the hard lumps or knots of size in the harness or when coming in contact with the reed. To overcome this disadvantage the sizing trough is mounted in such manner that it can be readily raised or lowered, so that when the machine is stopped the sizing trough may be lowered to such an extent as to carry the level of the sizing liquid below the bottom of the lower sizing roll, as shown in Fig. 3. The means employed for this purpose are a pair of racks $b$, one near each end of the sizing trough; these racks are guided in boxes or ways $b'$ upon the opposite side frames of the machine and are adapted to engage with pinions $d$ upon a transverse shaft $d'$, which is adapted to suitable bearings on the side frames of the machine and has at one end an operating lever $d^2$, which is adapted to engage with a notched bar $d^3$, on one of the side frames, so that it can be readily retained in any desired position of adjustment, the lever having sufficient elasticity to permit it to be sprung laterally out of engagement with the notched retaining bar when it is desired to lower the size trough. This construction also provides for the gradually raising of the size trough as the amount of sizing composition in the same diminishes, so as to maintain a uniform degree of submergence of the lower size roller in the composition.

The size trough has a hollow steam heated bottom, to which steam is conveyed from a pipe $c$ by means of a pair of pipes $c'$, jointed together where they meet, the lower pipe $c'$, being jointed to the pipe $c$ and the upper pipe $c'$ being similarly jointed to the branch pipe $c^2$ of the hollow bottom, so that the size trough can rise and fall without affecting the steam supply for heating the same. A similar system of pipes provides for the discharge of the water of condensation from the hollow bottom of the trough.

The hollow journals of the rolls A A′ are provided with stuffing boxes for the reception of branches of the steam supply pipe F, the inlet branch of said pipe being provided with a valve $f$, whereby the flow of steam may be permitted or cut off, as desired. The stem of this valve is connected to a lever $f'$, which is engaged by pins $i$, projecting from a rod or bar $m$, extending along one side of the machine. Another rod or bar, $m'$, extends along the other side of the machine, and these side bars $m$ $m'$ are connected to bars $n$ $n'$ at the front and rear of the machine by means of bell crank levers $p$, mounted upon brackets secured to the side frames of the machine at the four corners of the same. By this means a rod is provided extending entirely around the machine and having connection with the valve governing the flow of steam to the drying cylinders A A′, so that the flow of steam to said cylinders can be governed by an attendant standing at any part of the machine.

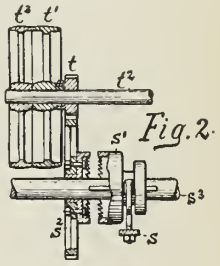


Fig.2.

This rod structure thus explained is also connected to the slowing down and stopping devices of the machine, so that steam may be partially or wholly cut off from the cylinders simultaneously with the slowing down or stopping of the machine and may be permitted to enter the cylinders again simultaneously with the speeding or starting of the machine. This is effected by connecting one of the rear bell crank levers $p$ to the upper end of an arm $r$ on the belt shipper, and also to a bar $r'$, which has a pin adapted to slide in a slot in a lever $s$, which operates a clutch sleeve $s'$ and serves to throw the latter into or out of engagement with a clutch hub formed upon a spur wheel $s^2$, the latter turning loosely upon a shaft $s^3$, and meshing with a pinion $t$, which is secured to the hub of a pulley $t'$, turning loosely on a shaft $t^2$, the latter also having a fast pulley $t^3$. The pin of the bar $r'$ is free to turn therein and has a nut whereby it can be secured in any desired position in the slot of the lever $s$, so that the position of the lever in respect to the shipper arm $r$ can be altered in order to effect the shifting of the clutch sleeve $s'$ toward or from the clutch hub on the wheel $s^2$, and thus provide for any desired amount of lost motion of said clutch sleeve. The shaft $s^3$ is geared by a pinion $v$ and spur wheel $v'$ to the shaft $t^2$, and the latter is provided with pulleys, whereby, the various other parts of the machine are driven.

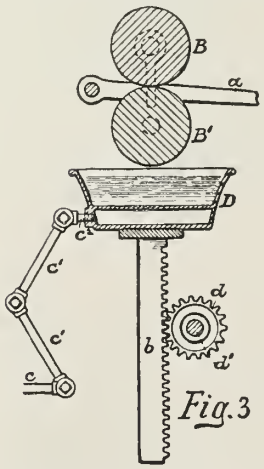


Fig.3

When the driving belt is applied to the pulley $t^3$, power is transmitted directly to the shaft $t^2$, and the machine is driven at high speed. When, however, the belt is shifted onto the loose pulley $t'$, the power is transmitted through the reducing gear described, and the speed of the machine is very much decreased. When the belt is moved from the pulley $t^3$ onto the

pulley $t'$, the clutch sleeve $s'$ is thrown into engagement with the clutch on the spur wheel $s^2$, so that the shaft $s^3$ will be driven by the latter. In order to stop the machine, the belt is moved backward on the pulley $t'$ until the clutch $s'$ is withdrawn from engagement with that on the spur wheel $s^2$, the pulley $t'$ being wider than the pulley $t^3$, in order to permit this backward movement of the belt thereon.

By being able to slow down the speed of the machine, provision is afforded for piecing broken threads without arresting the travel of the warp over the drying cylinders, thus preventing the formation of stripes of size across the warp, which is likely to result when portions of the sized warps are subjected to the action of the drying cylinders for a much longer time than other portions. By cutting off steam from the drying cylinders A A' simultaneously with the slowing down or stopping of the machine is also prevented the possibility of burning or scorching the sized threads, which might result if hot cylinders remained in contact therewith for a considerable time. *(The James Smith Woolen Machinery Co., Philadelphia, Pa.)*

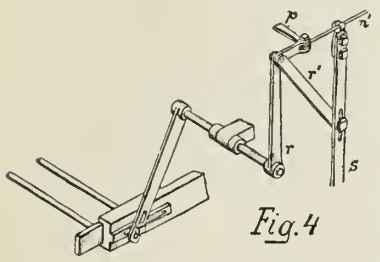
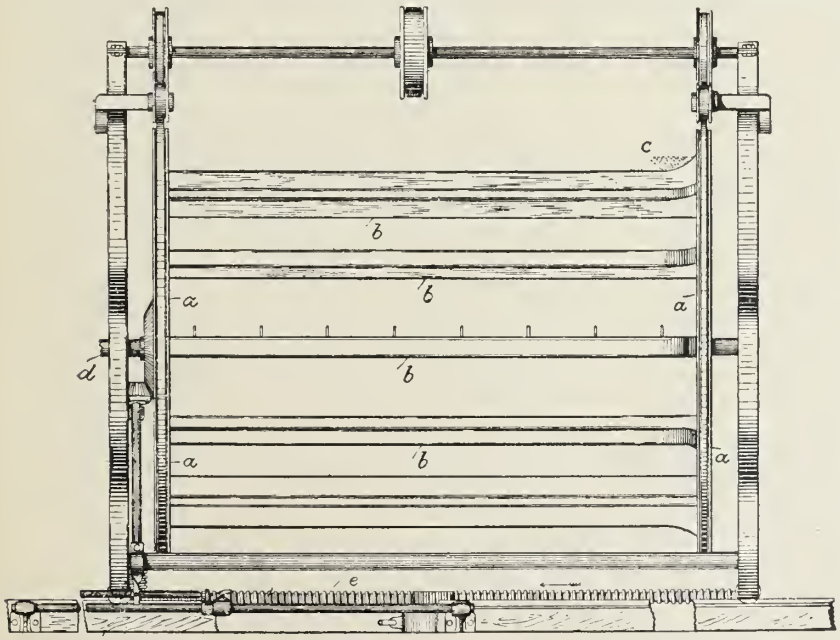


Fig. 4

## EASTWOOD'S SELF BUILDING WARPING REEL.

The illustration is a front elevation of this warping reel.

$a$ are the two flanges of the reel, $b$ its bars, $c$ indicates the manner in which the warp sections are built, showing that one section uses the preceding section for building upon; the oblique shape to the outside edge of the first section being produced by means of an incline on the right hand ends of the reel bars.




This method of building sections obliquely is accomplished by means of a spiral gear attachment placed underneath the warping machine, and is driven from the shaft $d$ of the reel as shown at the left hand side in the illustration. As the reel rotates, motion is transmitted to the said gear attachment which in turn moves the reel on the spiral shaft $e$ slowly towards the right hand side, thus causing each section in its turn to build to one side (the right in this instance) gradually as it fills up. *(John E. Eastwood, The Springville Mfg. Co., Rockville, Conn.)*

## THE DENN SECTION BEAM WARPER.

The special features of this machine are the improved doffing, measuring and driving devices.

Fig. 1 is a sectional side elevation of the warper, Fig. 2 is a front elevation of the driving mechanism and Fig. 3 is an end view of the ratchet wheel which drives the slow motion of the winding drum.

Referring to the sectional side elevation Fig. 1 we find a chain $a$, engaging a sprocket $b$, said sprocket being controlled by a worm gear $c$ meshing with a worm $d$, operated by hand wheel $e$. The ends of the chains $a$ (one on each side of the warper) are provided with rings $a'$, which, when the beam is to be doffed, are slipped over its ends. The hand wheel $e$ is then turned a few revolutions, releasing the levers $f$ from the beam, said levers being then raised and held in such position by a spring actuated stud $g$ as fast on the frame. The hand wheel $e$ is then turned and the beam is easily lowered on to the truck. When a new beam is to be put in place, the rings are slipped on and the operation described, reversed.

The measuring apparatus consists of a brass dial $h$, which is turned by means of intermediate gearing between it and the worm $i$ on the measuring cylinder $j$, over which the warp passes. To operate the measuring apparatus, set the finger $k$ to the desired number of yards as marked on the dial $h$, loosen the thumb nut $l$ and turn the finger $k$ back to its stop, next hold the finger firmly in place and tighten the thumb nut $l$. When the desired number of yards have passed over the measuring cylinder $j$, the finger $k$ comes in contact with a circuit closer $m$, connected to an electric battery, the contact between said finger and circuit closer causing an electric bell to ring, at the same time stopping the machine.

Referring to Figs. 2 and 3 we find the driving mechanism to consist of a fast and slow motion, the power being imparted to the drum for the fast motion by the pulley $n$, fastened to driving shaft $o$ by set screws $o'$. To the said driving shaft $o$ is attached a pinion wheel $p$ which drives the drum gear $q$. The slow motion is imparted to the drum by pulley $r$, to the hub of which is fastened the pinion $s$, and on the hub of which the loose pulley $t$ runs. The pinion $s$ meshes with a gear

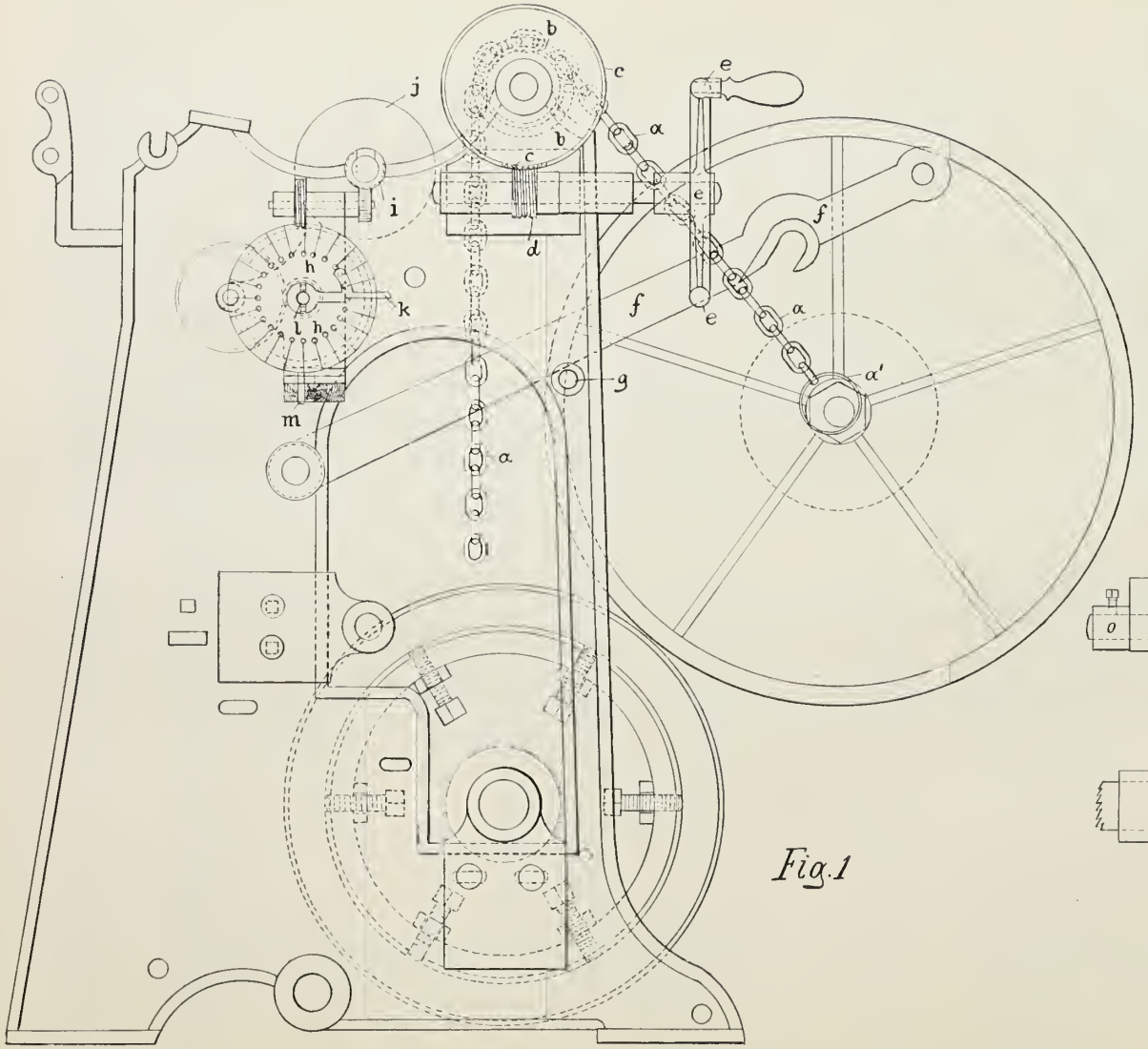



Fig. 1

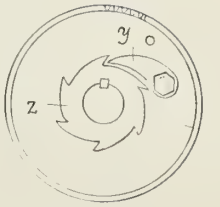



Fig 3




Fig. 2

wheel $u$, keyed on a shaft $v$, the other end of said shaft having a pinion $w$ secured thereon. This pinion $w$ drives the gear wheel $x$, loose on shaft $o$, and to which is secured a pawl $y$. On shaft $o$ is keyed a ratchet $z$ adapted to be engaged by the pawl $y$ and turn the shaft $o$ and thus the drum.

Thus it will be seen that this arrangement permits the belt to shift from slow to fast speed without causing a jerky motion, (as is the case in machines having a positive gearing) the ratchet wheel $z$ leaving the pawl $y$ as soon as the speed increases. *(Globe Machine Works, Frankford, Phila.)*

## DRAPER'S WARPING MACHINE.

In this machine means are provided for stopping the warper when a predetermined length of yarn has been wound upon the beam.

Fig. 1 is an end elevation of this warping machine, Fig. 2, on a reduced scale compared to Fig. 1, is a perspective view of the main frame, the fast and loose pulleys, the belt shipper, and means for controlling the latter; and Fig. 3 is a perspective detail.

A, A′ are the end frames. B B′ the fast and loose pulleys, $b$ the belt fork mounted on a sliding rod $b'$, $b^2$ the elbow lever for effecting longitudinal movement of the rod, $b^3$ the rock shaft having a treadle or foot board $B^x$ (for starting the machine) and a counterbalance weight W, and the rocker arm $b^4$, fast on the rock shaft and pivotally connected with and to operate the rod $b'$.

The winding drum D, on which the core of the beam $B^2$ rests, and is rotated to wind the yarn $w$ upon it, has secured to its journal at one end disk D′, having eccentric groove $d$ to receive a roller $d'$ on arm $d^2$, fast on short rock shaft $d^3$, mounted in the frame A′, whereby the rotation of the drum D will rock the shaft $d^3$. On the outer end of the said rock shaft is rigidly secured an upturned rocker arm $d^4$, to which is pivotally connected at $d^5$, pawl $d^6$, adapted to engage and rotate, step by step, a ratchet wheel $c$ as forming a part of the measuring mechanism.

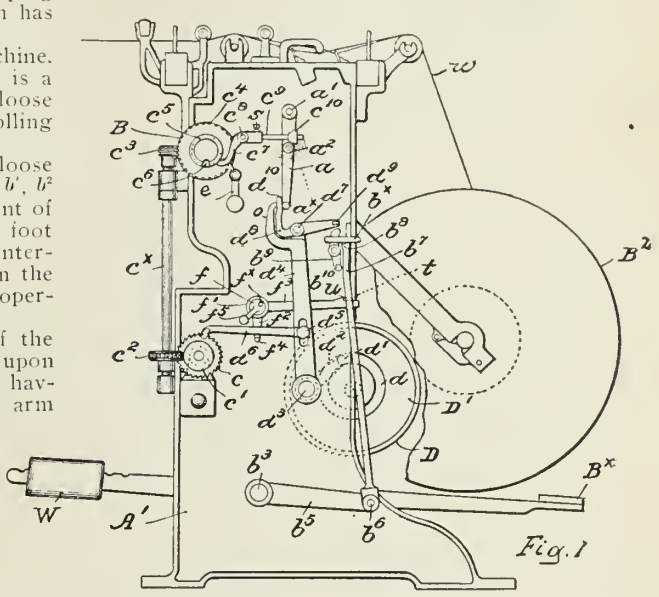
The starting and stopping shaft $b^3$ has fast upon it, outside the frame A′, an arm $b^5$, to which is connected at $b^6$ the upturned shipper rod $b^7$ extended through notched holding plate $b^x$ on the frame and provided with shoulder $b^8$ to engage the under side of the plate and maintain the stop motion mechanism inoperative when the machine is running.

Knock off lever $b^9$, pivoted on the frame adjacent the plate $b^x$, is provided with lug $b^{10}$ to at times engage the shipper rod $b^7$ and release the shoulder from the holding plate, the upper end of the knock off lever being slightly separated from the upper end of the shipper rod, as shown.

The upper end of the rocker arm $d^4$ has pivotally mounted upon it at $d^7$ a latch $d^8$ (shown separately in Fig. 3), said latch being formed as a bent lever with one arm normally extending over the top of the knock off lever $b^9$ and provided with a laterally extended toe $d^9$, adapted to enter between the shipper rod and the knock off lever when the machine is to be stopped automatically. The other arm of the latch is upturned at $d^{10}$ and is acted upon by a pin or stud $a^x$, extended laterally from a normally vibrating arm $a$, fulcrumed at $a'$.

The vibrations of said arm and the rocker arm $d^4$ are so timed that ordinarily the latch $d^8$ will be maintained in inoperative position with its toe $d^9$ above and out of engagement with the knock off lever as the rocker arm swings back and forth; but when the vibrator $a$ is held from coming back the latch is released, its toe $d^9$ engages the upper end of the knock off lever $b^9$, and as the rocker arm $d^4$ swings back said lever $b^9$ will be rocked to release the shipper rod $b^7$. Extension $o$ of the rocker arm serves as a backstop for the arm $d^{10}$ of the latch and prevents it from being thrown too far back.

The ratchet wheel $c$ has an attached worm $c'$ in mesh with a worm gear $c^2$, fast on an upright shaft $c^x$, supported in bearings on the frame and having at its upper end a worm $c^3$, which drives the "warper clock" which has a worm gear $c^4$ in mesh with and rotated by the worm $c^3$, and a worm $c^5$, having a deep groove, is rotated by and with the gear $c^4$, there being a slot $c^6$ at the end of the groove. A finger $c^7$, mounted to slide on a rod $c^8$, travels in the groove and is held therein by a weighted arm $c$ bearing against the finger, the finger dropping into the slot $c^6$ when it reaches




the end of the groove in the worm $c^5$. The upper end of the finger, beyond its fulcrum, has attached adjustably thereto by a set screw $s$ a stop, being a rod $c^9$ with a shoulder or head $c^{10}$, normally held in the position shown in Fig. 1, above a long roll or stud $a^2$, extended laterally from the vibrator $a$, so as not to interfere with the movement of the latter. When the finger $c^7$ reaches the end of the groove in the worm $c^5$, it drops into the slot $c^6$, turning said finger on its fulcrum and permitting the head $c^{10}$ of the stop to drop down behind the roll $a^2$ as the vibrator $a$ moves to the right, Fig. 1, into dotted line position and preventing the return movement thereof. The stud $a^x$ is thus held away from the latch $d^8$, so that on the forward swing of the rocker arm $d^4$ the toe $d^9$ of the latch engages the upper end of the knock off lever $b^9$, turning the latter as the rocker arm swings back and thereby releasing the shipper rod $b^7$ to effect the shifting of the belt and stoppage of the machine.

Eccentric $f$ is mounted on a pivot $f^x$ on the frame A′ engaged by a strap $f'$, secured to an elbow lever $f^2$, $f^3$, the depending arm $f^2$ having a lateral lug $f^4$ beneath the pawl $d^6$, the longer arm $f^3$ being shouldered at $u$ and extended through a hole $t$ in the shipper rod. A handle $f^5$ is secured to the eccentric $f$ to rotate the latter on its pivot $f^x$ and thereby move the elbow lever in one or the other direction.

It is sometimes necessary to run the drum D before

the beam is applied, and before the winding of the yarn is begun, and at such time the handle $f^5$ is turned to the right, Fig. 1, to move the eccentric disk $f$ on

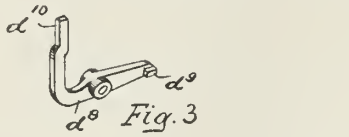


Fig. 3

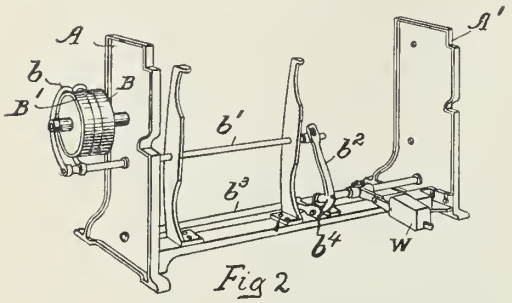


Fig 2

its pivot $f^x$, and thereby through the lug $f^4$ lift the pawl, but at the same time the shoulder $u$ operates to release the shipper rod $b^7$ from its holding plate. It is therefore necessary for the operator to keep the treadle $B^x$ depressed so long as the machine is running with the clock mechanism inoperative, so that the machine cannot run while the attendant is absent unless the ratchet wheel $c$ is turning by the action of the pawl $d^6$, the return of the disk $f$ to the position shown in Fig. 1 being necessary before the shipper rod can engage its holding plate.

When the disk $f$ is in the position shown in Fig. 1, and if the arm $f^3$ of the elbow lever is lifted, the arm $f^2$ will be swung to the right and upward to release or lift the pawl. The free end of the yarn $f^3$ is extended through the hole $t$ in the shipper rod $b^7$, and when the latter is released from its holding notch it rises, and thereby lifts the outer end of the arm $f^3$, rocking the elbow lever and releasing the pawl, as has been described, so that movement of the shipper rod into operative position effects the release of the pawl. *(Draper Co.)*

## ATHERTON'S WARPING MACHINE.

This warper more in particular refers to the preparation of warps for silk goods and is shown in illustration Fig. 1 in its side elevation. Fig. 2 is an enlarged (compared to Fig. 1) front elevation of the beam driving mechanism, Fig. 3 a tranverse sectional view through the latter, Fig. 4 an enlarged end elevation of Fig. 3, the shaft supporting bracket and the gear wheel on the same not being shown.

$a$ represents the warping frame provided on each side with an upwardly projecting frame $a'$, on which are mounted roller bearings $b$, supporting the shaft $c$, on which is secured the reel $d$, provided on each with an annular ring or flange $d'$, engaged by a metal band $d^2$, which latter is secured with one end to the frame $a$ and with its other end to a fulcrum lever $d^3$, which in turn is controlled by a weighted arm $d^4$, limited in its downward movement by a pin $d^5$, inserted into one of a series of holes $d^6$, arranged in the brace $a^9$ of the frame $a$.

The annular flange or ring $d'$ of the reel $d$ rests on a wheel or pulley $n^4$, (from which it receives its motion,) which latter is secured on a shaft revolubly mounted in levers $n^5$, pivotally secured, as at $n^6$, to the frame $a$.

On the shaft of said wheel or pulley is also secured a double grooved pulley $n^3$, connected by a chain or belt $n^2$ with a double grooved pulley $n'$, the latter being mounted on the driving shaft $n$, carrying the loose and fixed pulleys $m$, adapted to be operated by a belt. A belt shifter $m'$, held in normal position by a spiral spring $m^2$, is slidingly arranged in close proximity with its loose and fixed pulleys $m$ and is adapted to be controlled by the fulcrum lever $m^3$, operated from the foot treadle $m^5$ by an intermediate cord or chain $m^4$. The shaft carrying the double grooved pulley $n^3$ is held in frictional contact with the ring or flange $d'$ by the free end $n^7$ of a lever $n^9$, pivotally secured, as at $n^8$, to the frame $a$ and having its other end connected by a left and right hand screw $n^{10}$ to a foot treadle $n^{11}$. The central portion of said foot treadle is also connected to the free end of said lever $n^9$ by means of a cord or chain $n^{12}$, passing over intermediate pulleys $n^{13}$ and $n^{14}$, and thus providing additional means for operating the said lever.

On one end of the shaft $c$ of the reel $d$ are mounted two sprocket wheels $e$, connected by sprocket chains $f$ and $g$ with sprocket wheels $h$ and $h^3$, mounted, respectively, on the projecting ends of the endless screws $h'$ and $h^2$, which latter are parallel with the shaft $c$, and in rear and front of the reel $d$.

On the screw $h'$ is mounted, by means of a pivoted lever $i^{10}$, the reed frame $i$, having additional bearings on two parallel rods $i^{12}$ and $i^{13}$ and carrying guide rollers $i'$ $i^2$ and an intermediate guide plate $i^3$ and in rear of roller $i^2$ a reed $i^4$. Said reed $i^4$ is arranged in

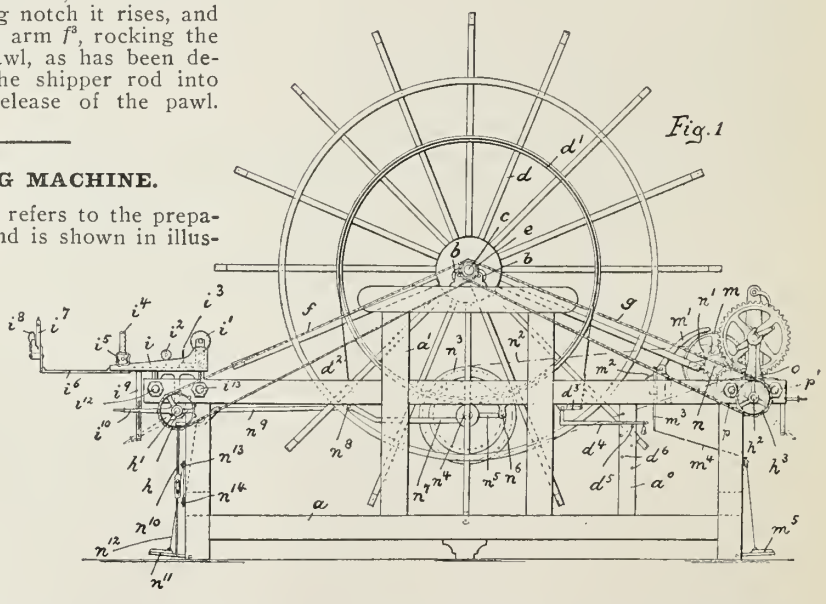
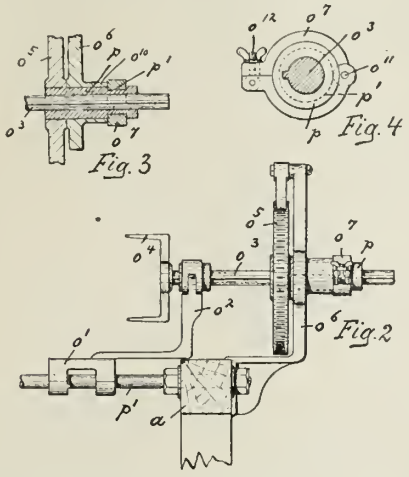


Fig. 1

grooved standards slidingly arranged on the reed frame $i$ and operated by a screw with a hand wheel $i^5$, which screw has its bearings in brackets fastened to the reed frame $i$. On a projecting arm $i^9$ of the reed frame $i$ is secured a reed $i^7$ and guide bar $i^8$. On the screw $h^2$ are mounted beaming frames $o$ and $o'$, having

additional bearings on the parallel rods $p$ and $p'$, adapted to carry a beam.

In the upwardly projecting portion $o^2$ of the beaming frame $o'$ and in an auxiliary bracket $o^9$, projecting outwardly from the side piece of the frame $a$, as shown in Fig. 2, is mounted shaft $o^3$, provided with a key and penetrating a sleeve $p$, journaled in the bracket frame $o^6$ and carrying a pawl controlled gear wheel $o^5$,




meshing with a pinion on the shaft $n$. The fact that the bracket $o^6$ projects outwardly from the side piece of the frame and supports the shaft $o^3$ and gear $o^5$ outside of said frame makes possible a greater lateral movement toward the bracket on the part of the beaming frame $o'$. The sleeve $p$ is provided near its outer portion with an annular groove $p'$, in which is arranged a clamp $o^7$, consisting of two halves pivotally connected, as at $o^{11}$, and having their opposite ends adjustably secured together by means of a clamping screw $o^{12}$. Said clamp $o^7$ bears against the projecting sleeve $o^{10}$ of the auxiliary bracket $o^9$ and thus prevents lateral movement of the sleeve $p$. The shaft $o^3$, which is hollowed out at its inner portion, as illustrated in dotted lines in Fig. 2 carries the clutch $o^4$, for holding the beam. *(Robert Atherton, Paterson, N. J.)*

## INDICATOR FOR WARPERS.

The object of the device is to provide a combined indicator and alarm which can be readily thrown into and out of engagement with its operating means, whereby the operation of the indicator and alarm can be arrested without the necessity of stopping the said operating means.

Fig. 1 is a front elevation of the combined alarm and indicator illustrated in connection with a portion of a warper frame and its reel shaft; Fig. 2 is an end elevation of Fig. 1.

$a$ represents a portion of a warper frame and $b$ roller bearings supporting the reel carrying shaft $c$ as provided with a collar $c'$ to thus prevent the lateral movement of said shaft. On the frame $a$ is secured a bracket $s^7$, provided with guides for the vertically arranged rod $s^4$, controlled by a spiral spring $s^5$, and prevented from rotation by having its lower polygonal shaped portion guided in a correspondingly shaped hole or opening in the lug $s^8$.

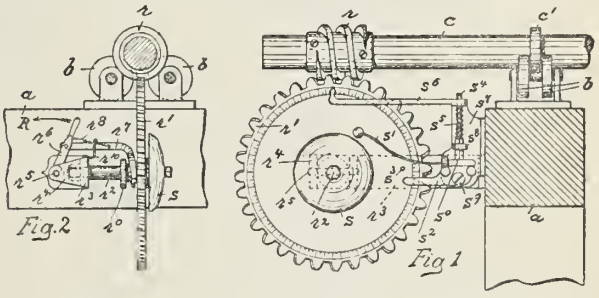
At the lower end of said rod $s^4$ is mounted a shoe $s^9$, carrying the gong hammer $s'$ and normally resting upon the lever $s^2$ fulcrumed at $s^9$ to the bracket $s^7$, and which lever is provided with an arm or projection adapted to be engaged by the pin $s^3$. To the frame $a$ is also secured a bracket $r^3$ parallel with the reel shaft $c$ and carrying at or near its free end a stub shaft $r^2$, on which is revolubly and slidingly arranged a gear wheel $r'$, adapted when in normal position to mesh with the worm $r$ on the reel shaft $c$ and to be operated thereby. On gear wheel $r'$, which is provided with graduation marks is secured the pin $s^3$; however a series of pins could be arranged on said gear wheels at specified intervals, in which case the gong hammer can be operated more frequently to correspond to shorter lengths of material to be wound on or off the reel. To the free end of the stub shaft $r^2$ is secured the gong $s$, operated by the gong hammer $s'$.

To projecting lugs $r^4$ on the front portion of the bracket $r^3$ is secured a pin or axle $r^5$ at right angles to the stub shaft $r^2$ and serving as a fulcrum for the lever $r^6$, which latter is provided with a handle and is pivotally connected about midway to the outer end of the arm or link $r^7$, the inner portion of which is downwardly curved and fork shaped and is in engagement with the annularly grooved collar $r^9$, surrounding the stub shaft $r^2$ and secured to and projecting from the gear wheel $r'$. A spiral spring $r^8$ connects the said link or arm $r^7$ with the upper portion of the hand lever $r^6$, and thus normally holds the gear wheel $r'$ in engagement with the worm $r$.

A hook shaped pin $r^{10}$ is secured to the bracket $r^3$ and engages the top portion of the link or arm $r^7$ to thus prevent its forked portion from disengaging the annular groove in the collar $r^9$.

A hand or pointer $s^6$ is secured to the upper portion of the bracket $s^7$ and projects outward across and has its point directly in front of and in a convenient position near the graduations on the gear wheel $r'$.

By this arrangement the amount of material which has passed through the machine can at any time be quickly ascertained and read from the graduations, and the machine can be stopped when the desired amount of material has been thus registered. The




gear wheel $r'$ can be rotated in either direction, and whenever the pin $s^3$ engages the projection of the lever $s^2$ the said lever is operated, in turn operating the shoe $s^9$.

Whenever it is desired to stop the indicator and alarm, the hand lever $r^6$ is moved in the direction of the arrow R in Fig. 2, whereby the gear wheel $r'$ is moved out of engagement with the worm $r$, but can be readily returned into engagement (assisted by the action of the spiral spring $r^8$) whenever the said hand lever $r^6$ is moved towards its normal position. *(Robert Atherton, Paterson, N. J.)*

## BENTLEY'S HORIZONTAL WARPER.

The object is to provide means between the creel and the reel whereby the threads can be readily selected by the operator and whereby after being so selected they are held distinctly separated from each

other throughout the warping operation, at the same time subjecting the threads to as uniform a tension as possible during the warping operation.

Fig. 1 is an enlarged detail view, partly in section, of so much of a warping machine as is necessary to be shown to explain the improved mechanism. Fig. 2 is a top plan view of the reed carriage, showing the reeds and the improved arrangement of the parting bars mounted thereon, and Fig. 3 is a plan view of a portion of the lease reed.

*f* is the carriage, which supports the reeds *g* and *h*, the former being mounted upon the end of said carriage which is the nearer to the beam and the latter being arranged upon the other end of said carriage, and a standard *i*, which carries the parting bars, said standard being disposed approximately midway the ends of said carriage.

The reed *g* is removably secured by means of a set screw or set screws *j*, in the bifurcated free end of an arm *k*, which projects into and has a telescopic

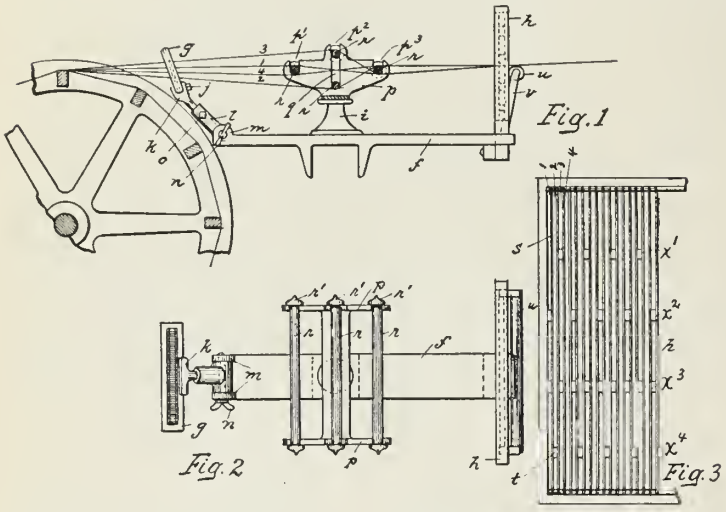


Fig. 1



Fig. 2



Fig. 3

arrangement with a sleeve *l*, that is fulcrumed between two lugs *m*, formed upon the carriage, the position of said sleeve, and consequently the arm and the reed which the latter carries being controlled by a thumb screw *n*. Parts *k* and *l* are rendered adjustable by set screw *o*.

The standard *i* supports a pair of brackets *p*, having recesses $p'$ $p^2$ $p^3$ formed in their upper edges and having extending downwardly from the base of the centrally disposed recess $p^2$ slots *q*, formed in their adjacent faces. The recesses $p^2$, since they are formed in an elevated portion of the brackets *p*, are situated in a plane slightly above that of the recesses $p'$ and $p^3$ and the bottoms of the slots *q* are in a plane correspondingly distant from the plane of said recesses $p'$ and $p^3$.

*r* designates the parting bars, as mounted in the recesses and the bottoms of the slots *q*, and which are provided with heads *r'*, which take on the outside of the respective brackets, and the parting bar which is arranged in the slots is somewhat shorter than the others, so that it may be readily placed in position between said brackets. One pair of the parting bars is in a substantially horizontal plane, whereas the other pair is in a vertical plane. *u* indicates a glass rod journaled upon the upper ends of fulcrumed brackets *v*, as mounted in operative proximity to the reed *h*, said glass rod being adapted to sustain the threads when the warper is in operation.

The reed *h* is especially designed to facilitate the operation of selecting the threads which are to be kept separated by the several parting bars. The dents *s* are spaced by blocks *t*, which are disposed in such arrangement that when the operator desires to select threads which are to be separated from each other by the several parting bars said threads can be readily identified. Fig. 3 shows the arrangement of these blocks which are secured to both the surfaces of the two dents or of a dent and the end piece of the reed frame, and are of metal and soldered in place. The arrangement of the blocks throughout the reed therefore consists of four parallel lines or series of said blocks lettered respectively as $x'$, $x^2$, $x^3$, and $x^4$.

The first thread passes through the first space of the reed and above the lower one of the first pair of blocks, the second thread passes through the second space and above the second or single block, the third thread passes through the third space and above the lower one of the second pair of blocks, and the fourth thread passes through the fourth space of the reed; and repeat.

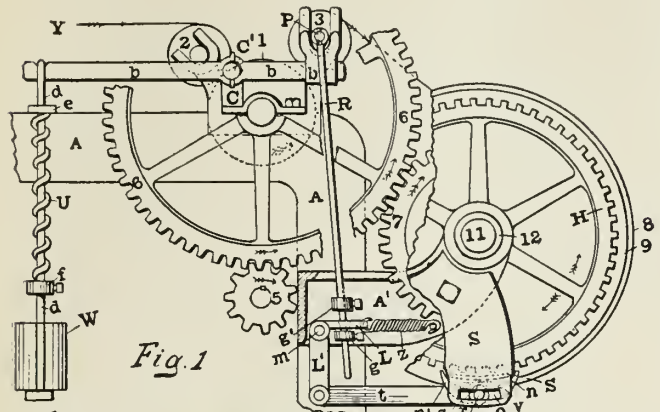
In selecting the various threads the operator depresses the warp with his hand between the creel and the reed *h*, whereupon the line of blocks $x^3$ will act to divide the threads into two sets. Having thus divided the warp into two sets of threads, upon further depression thereof a subdivision of the lower one of the two sets of threads thus formed will be effected by the series of blocks $x^4$, whereupon they may be maintained in the relative positions which they have now been made to assume, by the lowermost parting bar and by the parting bar farthest from the reed *h*. Now upon lifting or raising with the hand the upper set of warp threads a subdivision of them will also be effected by the series of blocks $x^2$, whereupon they may be maintained in their relative positions by the uppermost parting bar and the parting bar which is farthest from the reed *h*. In other words, the arrangement of the blocks between the dents of the reed is such that one line or series of them is adapted to effect a division of the warp threads, while the other series are adapted to effect subdivisions of said warp threads. As a result of the arrangement of the threads which has thus been produced, threads 1 and 3 will be above, while threads 2 and 4 will be below, the parting bar which is farthest from the reed *h*, and threads 2 and 3 will be kept separated from threads 1 and 4 by the lowermost and uppermost parting bars, respectively. Having thus effected a separation of the threads and sustained them in their various relative positions by three of the parting bars, the operator has only to place the other parting bar in position with threads 2 and 4 passing over it and threads 1 and 3 under it, the threads being thus maintained in a subdivided as well as a divided disposition. *(John H. Bentley, Paterson, N. J.)*

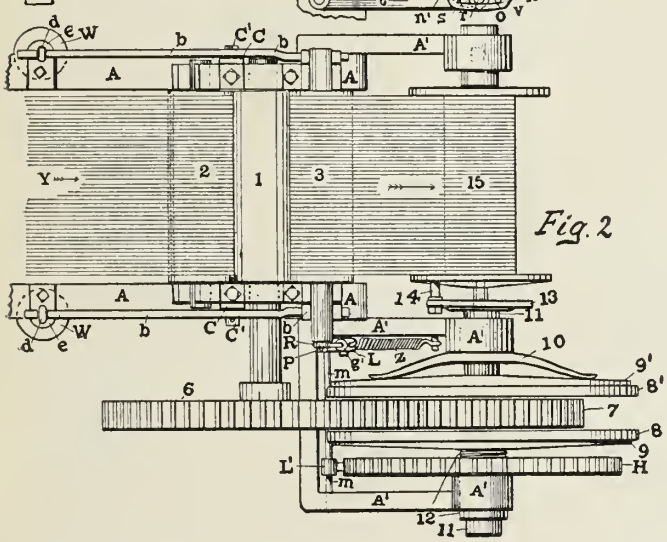
## AUTOMATIC TENSION GOVERNOR FOR WARP BEAMING MACHINES.

The object of this mechanism is to automatically govern the tension of the yarn during the process of beaming, producing a tension which can be mathematically figured out and maintained at all times without depending upon the judgment of the attendant and regardless of any defects in the friction disks or other causes.

Fig. 1 represents in side elevation the automatic tension devices, including the drum and the rolls over which the yarn passes and Fig. 2 is a plan view of the same.

A indicates the main frame, upon which are




mounted in bearings fixed upon it rolls 1 and 2, belonging to the series of rolls which pull the yarn Y. A third roll of this series (marked 3) is mounted in bearings upon levers *b*, which are pivoted on the main frame, one being provided for each end of the roll 3, as shown in Fig. 2. The levers are directly pivoted on studs C', which are on standards C.

In the winding, the yarn is drawn in the direction of the arrows, and passes over roll 2, under the roll 1, and out over the roll 3 to the warp beam 15. The roll 1 carries a gear wheel 6 and is driven by a pinion 5 on the belt shaft. The gear wheel 6 also meshes with a gear wheel 7, which is loose on the shaft of the warp beam 15. Fixed to the gear wheel 7 are the friction disks 8 and 8', all loose on the shaft 11. Fixed on the same shaft by means of splines are the disks 9 9', and when pressure is applied to the outside disk 9 the frictional contact between it and the disk 9', applied to the shaft through the wheel 7, causes the shaft to revolve and with it the beam 15. The motion from the shaft to the beam is communicated by means of a face plate 13 and stud 14, said stud engaging against any suitable projection on the head of the warp beam. The hand wheel H is mounted upon the shaft 11, its hub being internally threaded to engage with an externally threaded sleeve 12, connected with the friction disk 9. The outside of the wheel H bears against the part A' of the frame, so that when the wheel H is turned it forces the disk 9 inwardly, so as to apply pressure through the disk upon the wheel 7, this causing an increase of driving force and consequently an increase of tension in the yarn that is wound upon the beam. Reverse movement of the wheel H will relax the frictional contact and thus diminish the tension. A bow spring 10 is shown in Fig. 2 as interposed between the inner block A' and the inner disk.

The automatic regulation is accomplished by motion transmitted from the movable roll 3, having its bearings in the levers *b*, the strain of the warp passing over this roll 3 tending to force it downward and depress the ends of the levers upon which the roll is mounted. On the outer ends of these levers are tension devices, which consist of weights W and springs U, applied to rods *d*, which pass through ears *e* on the frame and have adjustable collars *f*. Springs U are placed between these collars *f* and the ears *e* and tend normally to draw down the outer ends of the levers and so force the roll 3 upward against the strain of the yarn. The tension of the spring is regulated by adjustment of the collar *f*, or the pull may be increased by increasing the weight. The roll 3 is turned by the warp which passes over it and with greater or less force, according to the tension of the warp. On the end of the arbor of the roll 3 is placed eccentrically a wrist pin P, to which is connected a pitman R, carrying on its lower ends adjustable collars *g'* and *g*, as situated on the upper and lower sides of an arm L of the bell crank lever L', through which the pitman R passes. The bell crank lever is pivoted at *m*, and its upper end is connected by a spring *z* to a fixed pin on the frame. The lower end of the bell crank lever L' is connected by a bar *t* to a pawl mechanism. The end of the bar *t* carries a pin *r*, on which are pivoted the two pawls *n n'*. The pin *r* projects through a slot *o* in cheek pieces *s* on a shield S, which is bolted to the frame outside of the wheel. The slot is parallel with the periphery of the wheel H and serves to guide the pawls, so that one or the other may operate upon the wheel. When one pawl is in position to engage with the teeth on the periphery of the wheel H, the other pawl rides on the edge of the shield S. The pawls are connected and held in place by a spring *s*, and are operated by reciprocating movement of the bar *t*, and the position of the bell crank lever L' determines which pawl will operate, and therefore in which direction the wheel will be turned and whether the frictional contact be increased or lessened. The position of the bell crank lever is determined by the position of the roll 3. If the said roll be depressed by reason of abnormal tension upon the yarn, then the pitman rod R will be pushed down, so that the upper collar *g'* thereon will press on the upper side of the arm L and throw back the lower part of the bell crank lever. In this position the operation of the wrist pin P will cause reciprocation of the bar *t* and will pass through the pawl *n'*, which is brought into action by this position of the bell crank lever to turn back the wheel, and thus release the screw pressure and friction, and this also determines the pull upon the warp. If, on the other hand, the strain upon the warp is abnormally light, it will permit the spring and weight to throw up the roll 3 and raise the bell crank lever L' into a position in which the pawl *n* is in en-

gagement, the other pawl riding on the edge of the shield. The reciprocation caused, as before, by the action of the collar $g$ and spring $z$ will give forward motion to the wheel and turn the screw to increase the pressure on the disks and increase, therefore, the strain upon the yarn by acceleration of the winding drum. The arms L and L', which constitute the bell crank lever, are located at different points on the shaft $m$, which has its bearings in the frame. An intermediate position of the roll 3 will bring both pawls out of engagement and render the device for increasing or diminishing the pressure inoperative, and the operation on either side of the extremes will be increased in proportion as the strain is greatest or least and the position of the roll 3 consequently at its lowest or highest limit. Thus the tendency of the apparatus is constantly to prevent any extremes of tension and to maintain an amount invariable, but determined by the tension of weight or spring applied to the outer end of the lever $b$. *(George Brown and Emil Dick, Auburn, Me.)*

## BEAMING MECHANISM FOR WARPING MACHINES.

The illustration is a front elevation, in detail, of this mechanism as used for transferring the warp from the reel onto its beam.

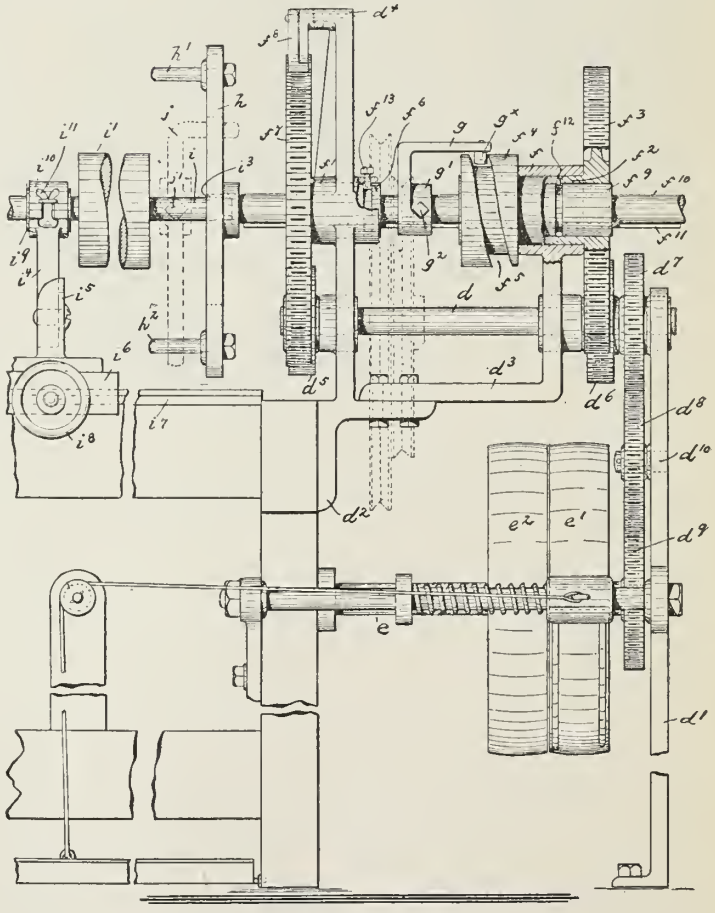
$d'$ is a standard of the beaming mechanism as placed in position near one end alongside of the main frame of the warper which carries the reel; and carried on the frame near said standard is a bracket $d^2$ consisting of an angular arm $d^3$, projecting laterally therefrom, and a vertical arm $d^4$. The arms of the bracket and the upper end of the standard provide bearings for the shaft $d$, carrying the pinions $d^5$ and $d^6$ of different sizes. Motion is imparted to the shaft $d$ through a system of gearing consisting of pinions $d^7$, $d^8$ and $d^9$. ($d^8$ being mounted on stub shaft $d^{10}$.)

On the shaft $e$ are mounted a loose and fast pulley $e^1$ and $e^2$, which carry the belt for operating the machine.

Arms $d^3$ and $d^4$ are provided (the former at its upper end and the latter midway its ends) with integral sleeves $f$ and $f'$. The sleeve $f$ forms the bearings for a bushing $f^2$, which carries at its outer end a gear $f^3$, and at its inner end a cam $f^4$, having a cam groove $f^5$. The gear $f^3$ meshes with the pinion $d^6$, carried on the shaft $d$. The sleeve $f'$ forms bearings for a bushing $f^6$, carrying a gear $f^7$, controlled by a pair of pawls $f^8$, pivoted to the vertical arm $d^4$. In the bushing $f^2$ is contained a collar $f^9$. Both the bushing $f^6$ and the collar $f^9$ are penetrated by a shaft $f^{10}$, having a longitudinal key $f^{11}$ engaging a corresponding groove in the bushing and the collar, and said collar and the bushing are prevented from lateral movement by set screws $f^{12}$ and $f^{13}$, the former being set in the bushing $f^2$ before the parts are put together and the latter being set in the sleeve $f^1$. From the foregoing it will be seen that the shaft is susceptible of a longitudinal movement within the collar $f^9$ and the bushing $f^6$.

The means for reciprocating the shaft consist of an angular arm $g$, integrally formed with an annulous $g'$, penetrated by and adjustably secured to the shaft $f^{10}$ by a set screw $g^2$ and carrying at its free end a roller engaging the cam groove $f^5$. The shaft $f^{10}$ carries at its inner end a clutch consisting of a cross bar $h$, secured at its center to the end of said shaft and carrying at its ends pins or projections $h'$ and $h^2$. Said clutch is adapted to support one end of and to operate the spindle $i$ of the beam $i'$. The end of the spindle fits in a centrally situated socket $i^3$ in the cross bar $h$, and its other end is supported upon a standard consisting of members $i^4$ and $i^5$, adjustably connected for vertical adjustment by a slot and set screw arrangement. The standard is supported on a carriage $i^6$, reciprocally mounted on a substantially **T**-shaped rail $i^7$, secured to the frame beneath the spindle, the carriage being therefore movable in the direction of the length of the spindle. The carriage is secured at any desired point on said rail by means of a hand screw $i^8$, which is adapted to bind against the rail in an obvious manner. The bushing $i^9$, forming bearings for the spindle, is removably secured between the top of the standard and a clamp $i^{10}$, held in place upon said standard by thumb screws $i^{11}$.

The beam spindle takes its motion from the clutch through a cross arm $j$, adjustably mounted upon the spindle by means of a set screw $j'$, one of its ends being in engagement with one of the projections $h'$ $h^2$ and the other of its ends being arranged at right angles and projecting into the path of the cross bar



$h$. (The construction last described is shown in dotted lines in the illustration.)

The belt for driving the machine having been put

in motion it is shifted from the loose to the fast pulley by the belt shifter and the shaft $d$ is rotated by means of the system of gearing which connects said shaft with the fast pulley. Said shaft communicates its motion to the beam through the pinion $d^5$, the gear $f^7$, the shaft $f^{10}$, and the beam spindle. The cam $f^4$ being held against lateral movement and being in engagement with the shaft $f^{10}$ through the angular arm $g$ and its roller $g^x$ engaging the groove in said cam thus imparts a longitudinal reciprocatory movement to said shaft, and consequently to the beam carrying spindle. At the same time the cam is caused to revolve independently of the shaft $f^{10}$ by means of the pinion $d^6$ and the gear $f^8$. Since said cam revolves independently of the shaft $f^{10}$, and according as the gears $f^7$ and $f^8$ and pinions $d^5$ and $d^6$ are relatively larger or smaller, the number of reciprocations imparted to said shaft in a given period is susceptible of being controlled.

The reciprocations imparted to the shaft produce a winding of the warp on the beam which is similar to that of a ball or cord—that is to say, the threads of the warp are caused to wind on the beam, crossing each other in lines which are more or less oblique to the axis of the beam. The angle at which said lines cross each other depends upon the amount or reciprocatory movement given to the shaft, and this in turn obviously depends upon the pitch of the cam groove $f^3$. *(Frederick L. Atherton, Paterson, N. J.)*

## REGISTERING MECHANISM FOR WARPING MACHINES.

The object is to provide a mechanism whereby the number of breaks in a set of yarn are automatically registered and preserved.

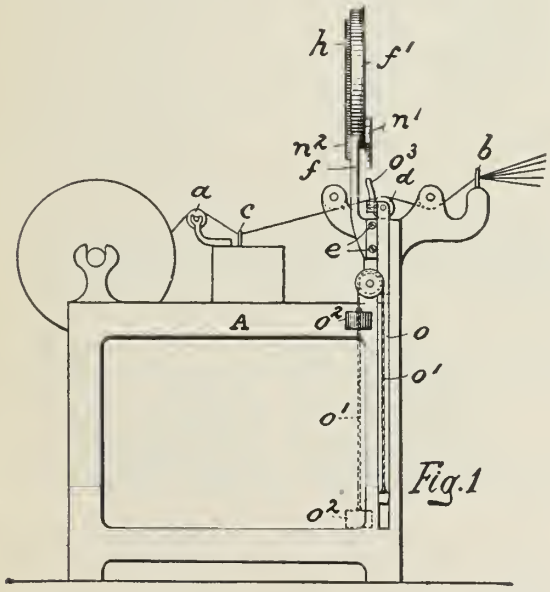


Fig. 1

Warpers generally have what is called a "rise roll" and immediately after the breaking of a thread the falling of a drop wire which was supported by said thread effects the stopping of the warper, the rise roll rising to take up the slack in the unbroken threads of the warp and prevent them from being snarled.

Fig. 1, in side elevation, represents a sufficient portion of a warper with the registering device added. Fig. 2 is a partial front elevation thereof, and Fig. 3 is a section taken through the line $x$-$x$, Fig. 2.

A indicates the frame work, $a$ the roll over which the set of warps of yarn or thread passes on its way from the reed $b$; $c$ indicates the drop wire and $d$ the rise roll.

Upon a part of the frame A there is attached by screws $e$, Fig. 1, an arm $f$, having at its upper end a case $f'$, it forming part of a registering mechanism.

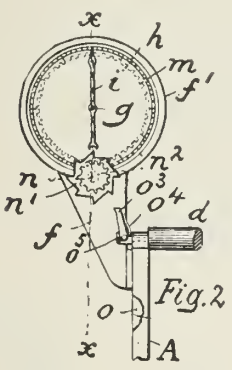


Fig. 2

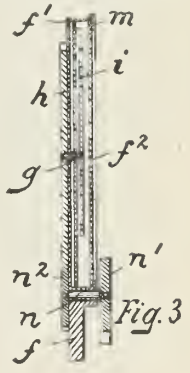


Fig. 3

This case has mounted in it a stud $g$, upon one end of which is fixed a toothed gear $h$ and upon the other end a pointer $i$, the said pointer being surrounded loosely by a dial $m$, said dial being marked to designate the number of steps of movement of the hand $i$. This dial is located between the toothed gear $h$ and the hand $i$ and is stationary. The case $f'$ has a glass face $f^2$. The part $f'$ of the arm $f$ has mounted in it a shaft $n$, provided at its front end with a ratchet toothed wheel $n'$, and at its rear with a pinion $n^2$, said pinion engaging the teeth of the toothed gear $h$, before referred to.

The rise roll $d$ is mounted at each end in a bar $o$, and lifted by strap and weight $o'$ $o^2$. The upper end of this bar $o$ carries a pawl $o^3$, the inner side of which is kept pressed by a spring $o^4$ against a lug $o^5$, so that said pawl when the rise roll $d$ rises after a yarn or thread of the set is broken will meet and move said ratchet wheel one step, causing the pinion $n^2$, acting on the gear $h$, to turn the hand $i$ one step over the stationary dial $m$, and the number of steps that the said hand turns will be indicative of the number of times the yarn or thread of that set broke when going through the warping machine. The ratchet wheel is turned by hand when the rise roll is down in working position to thus put the pointer back into its starting position. *(Draper Co.)*

## THE FAIRMOUNT CUT MARKER.

Fig. 1 represents a side elevation, partly broken away, of this marking apparatus, Fig. 2 represents a partial side elevation and partial vertical section of certain portions of this apparatus, Fig. 3 represents a view of the parts corresponding to those shown in Fig. 2, but in different positions, and Fig. 4 represents a partial side elevation and partial vertical section, on a reduced scale, of a portion of a beaming machine and one of the rolls seen in Fig. 1.

1 designates the frame of the apparatus, in which are journaled the rollers or drums 2, 3, 4 and 5, around which is passed the warp yarn 6, it being drawn from a hank or skein 7, placed on the floor 8. Said warp yarn passes through tension device 9 before it passes

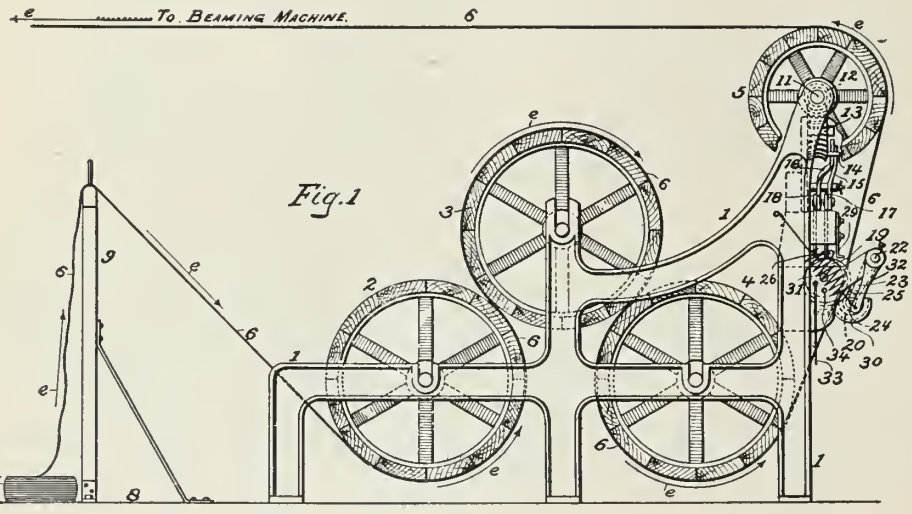
around the rollers 2, 3, 4 and 5, so that said yarn is held taut during the process of marking and beaming the same.

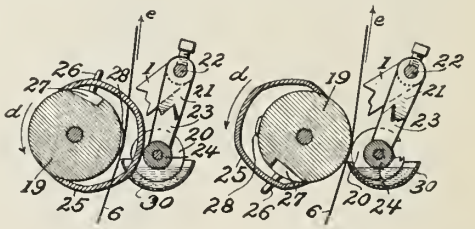
The warp yarn after leaving the roller 5 is wound upon a warp beam $9^x$ (seen in Fig. 4,) mounted in a beaming machine 10. The shaft 11 of the roller 5 is provided with a worm 12, which meshes with worm wheel 13, journaled in the frame 1 of the apparatus. Worm wheel 13 carries a stud 14, which is adapted to be brought in contact at certain times with the vertical members of bell crank levers 15 and 16, so as to rock the same and cause said levers to lift the stops 17 and 18. 19 designates a dry roller journaled in the frame 1 of the apparatus and over which passes the warp yarn 6 when the latter is being drawn through the marking apparatus by the beaming machine.

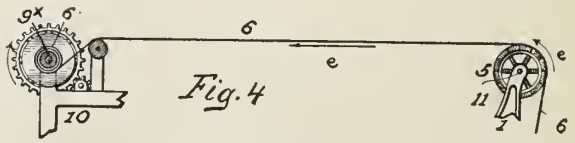
The object of the dry roller 19 is to provide a support for the warp yarn 6 when the latter is being marked by the inking roller 20, which is journaled in an arm 21 secured to a rock shaft 22 journaled in the frame 1. 23 designates an arm secured to the rock shaft 22; said arm 23 carries a roller 24, which contacts at certain times with a cam 25, carried by the dry roll or platen 19, said platen being provided with a lug 26, a groove 27, and a strip 28.

29 designates a stop loosely fitted to the frame 1 of the apparatus and adapted to be lifted at certain times by the lug 26. 30 designates a trough out of which projects the inking roller 20, which contacts with the warp yarn at the proper intervals. 31 designates a spring, one end of which is secured to the frame 1 of the apparatus, while its other extremity is attached to an arm 32, firmly secured to the rock shaft 22, the object of said spring 31 being to hold the roller 24 against the cam 25 and also to cause the inking roller 20 to come in contact with the warp yarn 6 when the cam 25 leaves the roller 24. 33 designates a pin passed through opening 34 in the frame 1, so as to engage a similar opening in the dry roll or platen 19, to lock the latter and prevent the same from rotating when so desired.

One end of the warp yarn 6 is taken from the hank or skein 7 and then passed through the tension device 9, after which it is brought under the roll 2, then over the roll 3 and under the roll 4, then between the inking roller 20 and dry roll or platen 19, then over the roller 5, and finally to the warp beam $9^x$. When the beaming machine 10 is in operation, it causes the warp beam $9^x$ to rotate, and in so doing winds the warp yarn 6 upon said beam $9^x$. The winding of the warp yarn 6 on the beam $9^x$ exerts a pull on said yarn, and thus draws the latter through the measuring apparatus and in the direction indicated by the arrows *e*. The rollers 2, 3 and 4 act as tension rollers for the warp yarn 6, and said rollers and the roller 5 are rotated by the friction of the warp yarn 6 as the latter is being drawn through the apparatus by the beaming machine 10. The rotation of the roller 5 transmits motion to the worm 12, and the latter rotates the worm wheel 13, and at a given time the stud 14 on said wheel 13 is brought in contact with the vertical member of the bell crank lever 15 and rock the same, thereby causing it to move outward, which will lift the horizontal member of bell crank lever 15 and cause the same to move upward and thereby raise the stop 17, with which it is connected. When the stud 14 has moved out of contact with the upright member of the bell crank lever 15, the latter returns to its normal position by its own weight, and the stop 17 likewise drops of its own weight and returns to its normal position. After the stud 14 has left the bell crank lever 15 it is brought in contact with the upright member of the elbow lever 16 and rocks the latter, causing its upright member to move outward which will cause the horizontal member of said bell crank lever 16 to rise, and thereby raise the stop 18 with which it is connected. When the dry roll 19 is in its normal position, (see Fig. 2,) the lug 26 is firmly held between the stops 17 and 29, and consequently said roll cannot rotate. When the roll 19 is in the position relatively to the roller 24 the inking or marking roller 20 is kept away from the warp yarn 6, said warp yarn is drawn over the metal strip 28 so that no wear



will be produced on said roll 19. When the stop 17 is lifted, it will thereby permit the lug 26 to rotate sufficiently to come in contact with the stop 18. This partial rotation of the roll 19 causes the strip 28 to move out of the path of the inking or marking roller 20, so that when said roller 20 comes in contact with the warp yarn 6 to produce a mark thereon, the ink or color from said roll 20 will not touch said strip 28 and any superfluous ink or color from the roller 20 will be caught by the groove 27 and be prevented from smearing the warp yarn 6. When the stop 18 is lifted, it is removed from the path of the lug 26 and the dry roll is then rotated by the friction of the warp yarn, which passes over the same and is caused to revolve.

When the dry roll 19 is in the position seen in Fig. 3, the cam 25 is not in contact with the roller 24 and consequently the spring 31 becomes operative and draws the arm 32 toward the dry roll or platen 19, thereby bringing the ink roller or marker 20 in contact with the warp yarn 6, so as to mark the same.

When the lug 26 contacts with the lower portion of the stop 29 and lifts said stop, and after clearing the latter is brought against the next stop 17, this prevents the further rotation of said dry roll, thereby causing the same to remain stationary until said stop 17 is again lifted. When the lug 26 thus has cleared the stop 29, the latter drops of its own weight and is then in a position to prevent the dry roll or platen from rotating in a direction opposite to that indicated by the arrow *d* in Figs. 2 and 3, which would otherwise occur when the warp yarn 6 is drawn in a direction opposite to that indicated by the arrows *e* in Fig. 1, which is sometimes done during the process of beaming. *(The Fairmount Machine Co.)*

## SECTIONAL DRUM FOR BEAM WARPING MACHINES.

The object is to provide a sectional drum for beam warping machines arranged to permit of conveniently replacing a worn out or broken drum with a new one instead of requiring an entire new drum when renovating a machine.

Fig. 1.

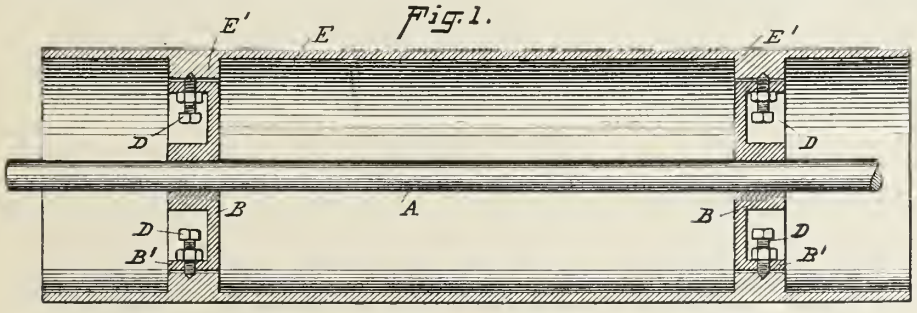
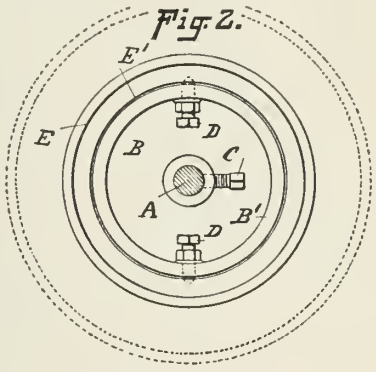



Fig. 1 is a longitudinal section, and Fig. 2 an end elevation of this drum.

The drum is provided with shaft A, rotated by gearing in unison with the other parts of the machine. On the shaft A are secured the two webs B by set screws C, screwing in the hubs of the said webs. Each of the webs B is provided with a rim B', in which, screw set screws D, engaging with their outer ends the inner faces of registering bosses or internal flanges E', formed on the under side of the rim E for the drum. By the arrangement thus described the rim E can be readily adjusted so as to bring its peripheral surface concentric to the shaft A to insure a proper running of the drum rim when the shaft A is rotated, again, the drum rim E can be readily detached and removed from the other parts of the drum by unscrewing the set screws D to permit removal of the rim E in case the said rim is worn out or otherwise injured and a new one is necessary.

It will be seen that drum rims of different diameters may be used and placed in position by the said set screws D on the said webs for one and the same warping machine, according to the work under treatment, it being understood that in such cases the

Fig. 2.




bosses or internal flanges E' are made of greater or less thickness, according to the size or diameter of the drum rim. (See dotted lines in Fig. 2.) *(John Cocker, Philadelphia, Pa.)*

## AUTOMATIC TENSION WIRE AND BOBBIN BRAKE FOR WARPERS.

The object of the device is to regulate the tension of the yarn and prevent slack yarn from the bobbins running onto the creel; the device consisting of a bent wire bridle having a weight or brake shoe thereon hung from the creel standards at each end and in front of each bobbin and resting upon the thread or end as it runs off the bobbin.

Fig. 1 is a perspective view of the device. Fig. 2 is a side elevation of a section of a warper's creel, showing the device in different positions caused by the running of the threads.

o represents the tension wire or bridle, having eyes 1 bent at the ends to receive nails for hinging the bridle to the creel standards 3 at each end of the bobbin 5, which allows the wire o to swing loosely as it rests on thread or running end 6. Bobbins 5 run on creel pegs in holes 8 in standards 3. From one of the eyes 1 the wire is bent back in arm 2 and out at about a right angle thereto in brake finger 4, to which is attached the brake shoe 4', made of metal to give the proper amount of drag on the bobbin head on which it rides smoothly.

If the thread runs slack, the falling wire follows it and takes up the slack and prevents its running onto the warp mill or beam or from lashing into the next end and being carried thereby onto the mill or beam,

and should this slackness be more than the falling wire will take up, brake shoe 4′ falls on the bobbin head and slows up the motion of the bobbin until the thread is brought to an even draw again. Imperfect winding of the bobbins and other causes vary the speeds of the bobbins, and the positions of the wires

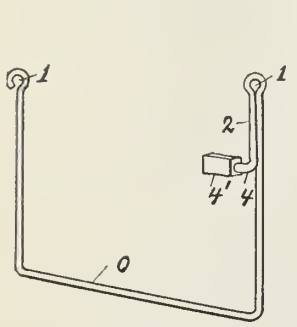


Fig. 1

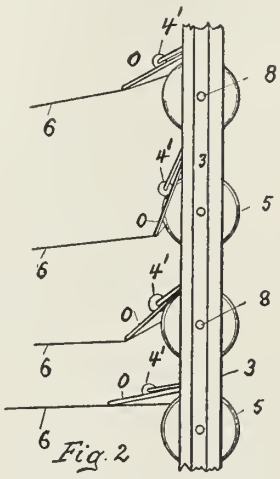


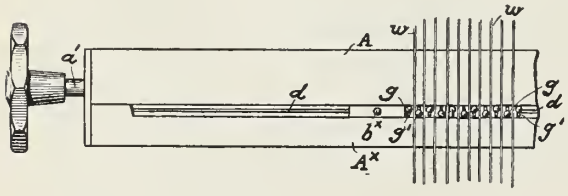
Fig. 2

o are constantly changing to different angles up and down, as shown in Fig. 2. The thread is taken from the upper side of the bobbin instead of from the under side, as is often done, allowing a direct weight, which can also be used as a brake shoe. *(Thomas Hy. Smith, Jamestown, N. Y.)*

## WARPER COMB.

It is necessary in these devices to separate or bring nearer together the upright wires or guides which serve to divide the warp threads, and this is usually accomplished by means of a coiled spring, the guides being inserted between the coils, and by suitable mechanism the spring is expanded or allowed to contract.

A indicates the transverse stand or support recessed in its front face to receive adjusting collars or sleeves mounted upon a right and left screw threaded adjust-




ing shaft or rod $a'$. The pins $b^x$, secure springs (not shown) to the adjustable sleeves previously referred to. Rotating the adjusting shaft $a'$ will move the sleeves toward or from each other to permit the coils of the springs to contract or expand to thereby vary the distance between the warp guides, which are upright wires $g$, rounded in cross section at their upper ends and having flattened shanks $g'$ to pass between the coils of the springs, the lower ends of the shanks entering a longitudinal recess, formed in the stand A, a retaining wire $d$ being extended loosely through holes in the feet of the guides.

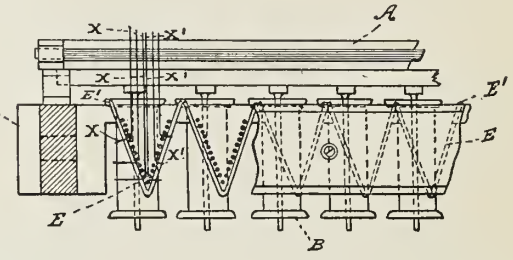
To permit the rounded guides to be brought into close proximity and to still allow the warp threads to pass freely between them, the guides are so constructed that the upper rounded ends of the alternate guides will be staggered, as clearly shown in the illustration. This is conveniently effected by making the shank somewhat wider than the diameter of the upper end of the guide, and offset from the latter along one edge, adjacent guides having their shanks oppositely turned. By staggering the alternate guides, as described, they may be moved very closely together when necessary without interfering with the free passage of the warp threads $w$. A cap $A^x$ protects the springs, and adjacent mechanism from dust and dirt, the top edges of the cap and stand leaving a clearance space through which the upright guides pass. *(Draper Co.)*

## REED FOR WARPING MACHINES.

The objects are to reduce the size of the creel board, at the same time increasing its capacity, besides avoiding bunching, knotting, wearing and cutting of the threads.

The illustration is a plan view of the front of the creel frames shown part in section and part broken away in order to see the reed, which is formed in a series of **V**-shaped angles for increasing the number of dents without lengthening the reed, which is provided with glass rods conforming to the shape of the reed, and over which the threads pass in going through the reed.

In being unwound from the bobbins B, which are divided into two series on the creel frame A (the




upper and lower half) the threads X from the upper half are brought from the right hand side of the bobbins to the left hand side of the angles of dents and the threads $X^1$ of the lower half from the left hand side of the bobbins are brought to the right hand side of the angles of dents. Thus the threads pass upward and over the said rods E through their respective dents in the reed, their positions in passing each other being constantly changing, with the result that the threads are kept separate and disentangled.

The glass guide rods E are bent to form an angle, so as to fit against the dents at the bottom of the reed, and the ends of said rods are bent downwardly as at $E^1$ to overlap the bottom rail C of the reed frame, thus locking them snugly against the reed dents. *(T. A. Robinson and R. L. Shaw, Paterson, N. J.)*

## CREEL FRAME.

The object is to increase the capacity of the creel frame without materially increasing its size.

Fig. 1 is a side view partly in section of this creel frame. Fig. 2 is a side view of a part of this creel

frame, partly in section, showing the frame provided with two series of swinging yokes pivoted to the main body of the frame, one series of yokes rising above the other series and each yoke having mounted thereon a group of pins adapted to support bobbins thereon.

A is the main body of the creel frame to which are rigidly attached the pins *b*, which support the bobbins C.

B B′ are swinging yokes, upon which are mounted the pins *f f*, respectively, which support the bobbins D. The yokes B B′ are pivoted at each end to the frame of the creel, as shown at *h h′*, each of the yokes B being placed over a row of the pins *b*, as shown in Fig. 1, and each of the yokes B′ being placed over a yoke B, as shown in Fig. 2.

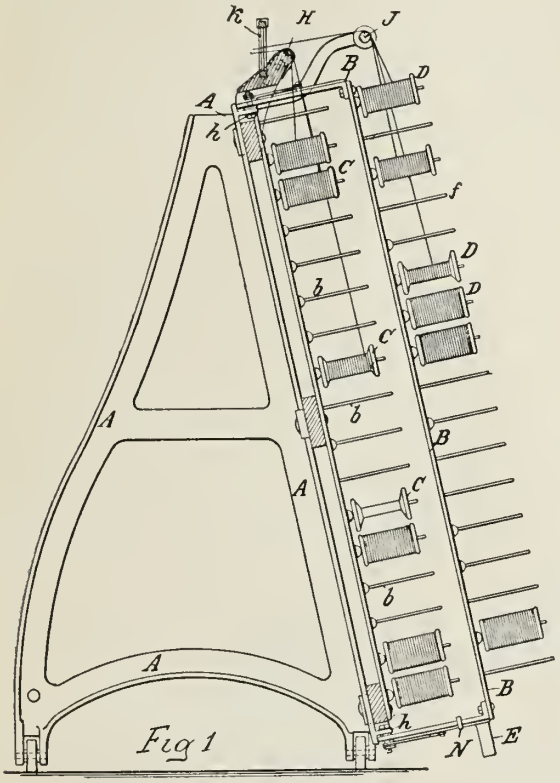


Fig 1

H is a glass rod, over which pass the threads from the bobbins C. J is a similar rod, over which pass the threads from the bobbins D. *k* are the small vertical glass rods between which the threads pass in their run to the lease reed. The pins are arranged in

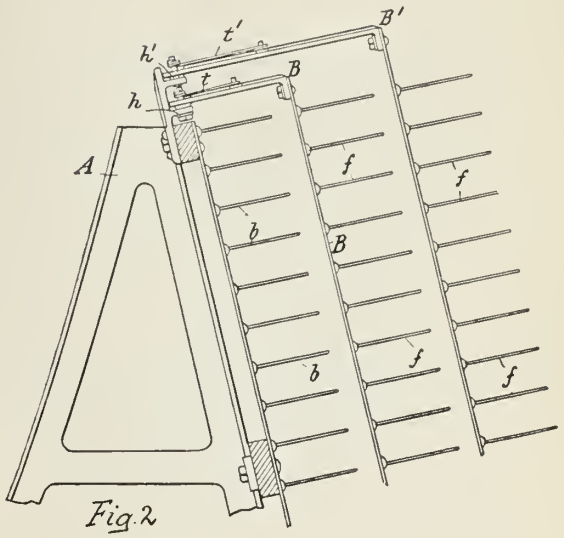


Fig. 2

oblique rows to prevent the interference of the threads from the several bobbins. The yokes can be readily turned to one side, thus permitting access to the bobbins upon the pins beneath without disturbing any of the bobbins on the yokes. The lower end of the yoke is provided with a leg E, projecting downward, against which the operator may press his foot, thus turning the yoke to one side, thereby leaving both hands of the operator free.

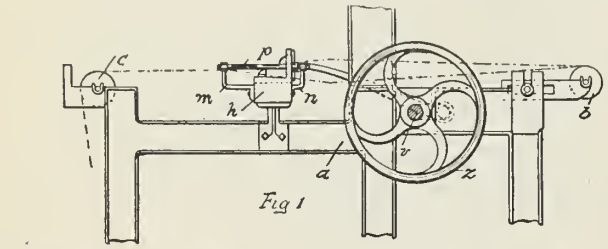
In order to economize space, by permitting the several rows of pins to be placed closer together, the lower ends of the yokes are provided with a laterally projecting arm N, of such length that as the yoke is turned to one side and before the bobbins on that yoke come into contact with the bobbins on the next yoke the end of the arm N will impinge against the latter yoke and in turn move it to one side, thus removing the bobbins thereon out of the way of the bobbins on the yoke first moved. Each yoke is provided with a spring *t t′*, against which the yoke is turned to one side, the corner of the end of the yoke being rounded, to permit of the movement, the said spring acting to return the yoke to its original position when the pressure upon it is released. *(John P. Cronin, Paterson, N. J.)*

# MISCELLANEOUS.

## EASTWOOD'S BROAD SILK LOOM.

This loom is provided with a stationary batten and with a horizontally reciprocating reed, by which arrangement the filling is beaten up by the reed without the necessity of moving the entire batten, requiring in turn less power for operating the loom, at the same time permitting a higher speed.

Fig. 1 is a side elevation of a portion of this loom, and Figs. 2 and 3 are a transverse sectional and a




front view, respectively, of the stationary batten and the reciprocating reed detached from the loom.

*a* represents the loom frame, supporting the warp and cloth beams *b* and *c*, and the main driving shaft *v*, carrying the hand wheel *z*. The batten *h* is secured by brackets to the sides of the loom frame *a*, and its central top portion is provided with a dove tailed groove *h'*, in which is slidingly arranged a top plate or raceway *g*, to the rear portion of which is secured the lower bar of the reed frame *e*, provided with dents *f* and constituting the reed *d*.

The batten *h* sustains two pairs of brackets *m* and *n*, projecting respectively from the front and rear portions of the batten and provided at their upper or free ends with tubular enlargements or sleeves *o*, which are connected and penetrated by a guide bar *p*, removably held in position by set screws *q*, arranged in said sleeves, and which guide bars are above and at right angles to the batten *h*. To the end or vertical bars *r* of the reed frame are secured tubular projections or sleeves *s*, strengthened by ribs *t*, projecting from the rear faces of the bars *r* and slidingly arranged upon their respective guide bars *p*.

The means for effecting reciprocation of the reed consists of pitmen *u*, each of which is pivotally connected at one of its ends to its respective sleeve *s*, as at *w*, and at its other end to the driving shaft *v*, there being no difference between the ordinary loom and the loom thus described, excepting that the batten remains stationary and the reed is horizontally reciprocated, guided upon the bars *p*, thereby effecting the beating up of the filling. *(Benjamin Eastwood, Paterson, N. J.)*

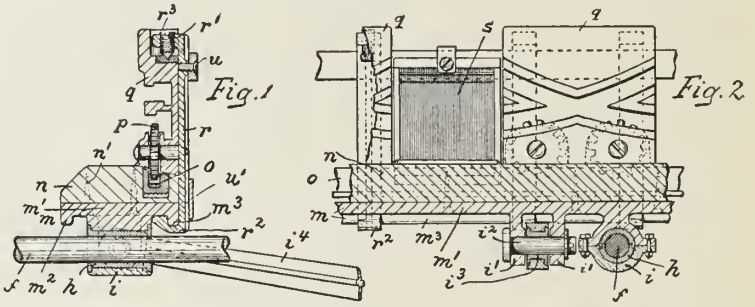
## BEATING UP MOTION FOR RIBBON LOOMS.

The object is to do away with the heavy batten and the lay swords supporting the same, providing in their place a longitudinal reciprocating rail on which the shuttle blocks, the reeds, and the operating mechanism for the shuttles are mounted, arranged to slide on a guide rod towards and from the fell of the cloth for the purpose of beating up the filling, thus producing simplicity of construction, easier motion and consequently higher speed possible.

Fig. 1 is an enlarged transverse sectional view of the reciprocating rail and of the parts mounted thereon, also showing a portion of the guide rod and of the operating lever. Fig. 2 is a detail front elevation of a portion of said reciprocating rail (shown in section) and of the shuttle blocks and one of the reeds mounted thereon, *f* indicates the guide rod as mounted at right angles to the main driving shaft of the loom, in brackets fastened to the loom frame, respectively to the rear of breast beam and the front of the high arch of a ribbon loom.

Two of these guide rods *f*, one for each end of the loom are generally used, and upon each is slidingly mounted a bushing *h* arranged in a two part sleeve *i*, downwardly projecting from and one part thereof, being integral with the rail *m*, which latter is parallel with the main driving shaft and takes the place of the ordinary batten.

The rail *m* consists of a flat piece of metal *m'*, provided at its longitudinal edges with downwardly pro-




jecting strengthening ribs $m^2$ $m^3$. On the top portion of said metallic rail *m* is secured a wooden raceway *n* by screws *n'*. On the beveled rear portion of this raceway *n* are mounted at intervals the shuttle blocks *q*, and which are adjustably secured to said raceway by means of the clamps *r*, whose bent over portions *r'* are provided with set screws $r^3$, that engage the top portions of said shuttle blocks, and whose lower portions are hook shaped, as at $r^2$, and in engagement with the rail or frame *m* and its strengthening rib, respectively.

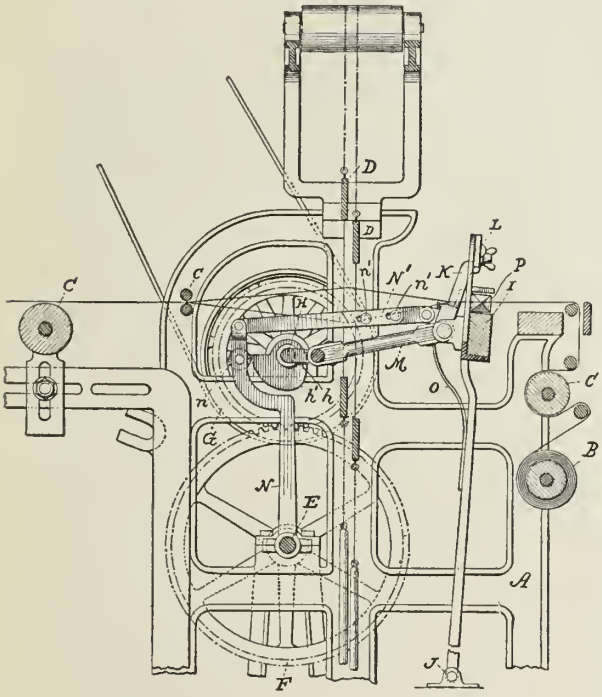
The pinions *p* are operated by the rack bar *o*, as slidingly arranged in the raceway *n*. The reeds *s* are mounted between the shuttle blocks and upon said raceway, strips *u* and *u'* are provided for sustaining the reeds and of bracing the various clamps *r*.

Adjacent to each sleeve $i$ are downwardly projecting lugs $i'$ which are penetrated by a pin $i^2$, on which is loosely mounted the bushing $i^3$, arranged in the forward end of the pitman $i^4$, the rear portion of which is connected with the main driving shaft or crank shaft of the loom.

The operation of beating up the filling by means of the improved device is thus:—When the main driving shaft is rotating, the pitmen are being operated, and by their connection with the downwardly projecting lugs of the rail $m$ they reciprocate (slide) the latter upon the guide rods $f$ and the reeds accomplish the beating up of the filling in precisely the same manner as in a ribbon loom in which the batten is being oscillated. *(Schaum and Uhlinger, Philadelphia, Pa.)*

## BEATING UP THE FILLING BY MEANS OF A MOVABLE REED.

The object is to beat up the filling by means of the reed (which is movable) at the proper moment when the beating up of the filling towards the fell of the cloth occurs.




The illustration is a side elevation, partly in section, of a silk loom having this beating up, *i. e.*, reed actuating mechanism added.

A is the frame of the loom, provided with take up rollers B, guide and tension rollers C, etc., and heddles D. E is the driving shaft of the loom, provided with gear wheel F, meshing with a gear wheel G on crank shaft H, which crank shaft moves the batten I, pivoted at its lower end J and provided with a movable reed K, pivoted at its upper end L to the upper end of the batten, which is swung by means of pitman M, pivotally connected to the batten at one end and to a crank $h$ on the crank shaft H.

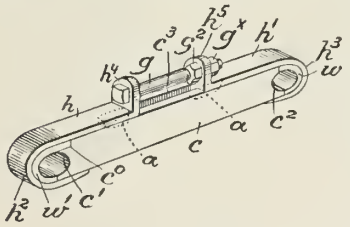
The mechanism consists in a lever N secured loosely upon the shaft E, and which lever N is provided with a roller $n$, adapted to be operated upon by a cam $h'$ on the crank shaft H. This cam $h'$ is formed with an abrupt "drop" between its highest portion and a lower portion as clearly visible in the illustration. The lever N is connected to the lower end of reed K by a draft connection, comprising a link N' for drawing upon the reed, which link is pivoted at one end to the actuating lever N, and at the other end to the reed. The link N' is a two part link adjustable in length by means of a set screw and slot connection $n'$. O is an actuating spring for throwing the reed forward to give the beat up motion, *i. e.*, a sharp, quick stroke to the filling; P indicates the shuttle.

The crank $h$ on the shaft H imparts to the swinging batten I the usual positive forward and backward motion. The reed, however, in its entirety does not fully partake of the forward motion of the batten, but as the batten moves forward is retracted by the cam $h'$, which swings the reed on its pivot L. When the crank $h$ is on a dead center and the batten is in its farthest forward or normal beating up position, the bowl or roller $u$ rolls or drops off the high portion of the cam onto a lower portion thereof and the reed is snapped sharply forward by the spring O, which has been put under tension by the retraction of the reed, and the batten and reed are then retracted by the crank. *(Eduard Herzig, Union Hill, N. J.)*

## PITMAN FOR COTTON LOOMS.

The object of this pitman is to be able to get along with one dagger (at or near one end of the lay) in the protector mechanism of a loom in place of the two daggers which were used until now to prevent twisting of the lay, one dagger, if used, in connection with two common pitmen, causing too heavy a strain on the pitman as well as the other parts of the loom, and particularly on that pitman remote from the dagger, that the bearings thereof would wear loose so rapidly as to necessitate the substitution of a new pitman after a very few operations of the protector mechanism. The new pitman enables to dispense with one dagger and its coöperating frog, at the same time greatly increasing the effective life of the pitman.

The illustration is a perspective view of this pitman as used on the remote side of dagger, the other pitman, *i. e.*, the one nearest the dagger, being of the usual construction.




The pitman comprises a wooden body portion $c$, having its ends transversely recessed, as at $c^1$, $c^2$, a longitudinal slot $c^3$ being formed in the upper face of the body portion. Each end of said body portion has metallic shoes $h$, $h^1$, bent around its ends, as at $h^2$, $h^3$, to form with the concave ends $c^1$, $c^2$, thereof substantially circular bearings for the crank pin and the pin connecting the pitman with the lay. These shoes are of a **U**-shaped form, the upper legs resting upon the top of the body portion $c$ and are provided with depending longitudinal ribs $a$, to enter and be guided by the slot $c^3$, the inner ends of the said legs being provided with upturned lugs or ears $h^4$, $h^5$. A headed bolt $g$, threaded at one end, is passed through holes in said ears and a nut $g^x$ is screwed upon the threaded end of the bolt, at the outer side of the ear $h^5$, a check nut $g^2$ being provided at the opposite side of the ear. By tightening the nut $g^x$ the shoes, which form tension members for the pitman, are drawn toward each other and securely held in

place on the body portion $c$. Leather linings $w$, $w^1$, are inserted within the bends of the shoes, to form with the concaved ends of the body portion $c$ non metallic wearing surfaces for the bearings. The body portion $c$ is recessed at its larger end, as at $c^0$, to receive one end of the lining $w^1$ between it and the adjacent shoe $h$.

When the pitman is subjected to tensile strain it will be resisted by metallic tension members $h$, $h^1$, and transmitted from one to the other through the rigid connection $g$, so that there will be no tendency to split or shatter the body portion $c$, and the journals or pivot members within the bearings at the ends of the pitman will bear directly against the non metallic linings $w$, $w^1$ for the tension members, nor will these be any movement of the tension members relative to each other.

When the single dagger engages its frog the momentum of the lay tends to twist it, but this sudden strain upon the parts and the tendency of the lay to twist is effectually resisted by the tension members of the new pitman, and owing to its construction as described the said pitman cannot be readily disarranged or broken. *(Draper Co.)*

## CLEMENT'S FILLING CUTTER FOR NORTHROP LOOMS.

This cutter works in connection with the filling supplying mechanism of Northrop looms as described in a previous article on pages 37-38; a thread cutting temple as explained on page 114 of "Textile Machinery Part I," being also employed.

The object of this cutter is to provide means to sever the filling end upon change of filling carriers so that the length of the end pulled away by the ejected filling carrier will be as short as possible, at the same time holding the short length of filling remaining outside of the selvage between the cutter and the edge of the cloth; this end in turn being severed by the cutting blade of the temple on the inward movement of the lay.

The construction of the filling supplying mechanism and its operating parts are the same as in the article referred to on pages 37-38, in which an upturned arm is used to form a shuttle feeler but in the present invention this arm is bifurcated, thus forming two branches $p^x$ and $h^x$ as shown in illustration Fig. 1, which represents a plan view of a portion of a loom showing this cutter in operative position. Fig. 2 is an inner side elevation of the cutter which consists of the rearwardly extending branch $p^x$, notched as at $p'$, a steel blade $p^2$ being fixed to the inner branch while a movable blade $p^3$ is mounted to rock on a stud $a$. The branch $h^x$ is cut away to leave an overhanging projection $h^1$ on which is mounted a weighted jaw $h^2$, fulcrumed at $o$, and having a slot near its front end to receive a guide stud $b$.

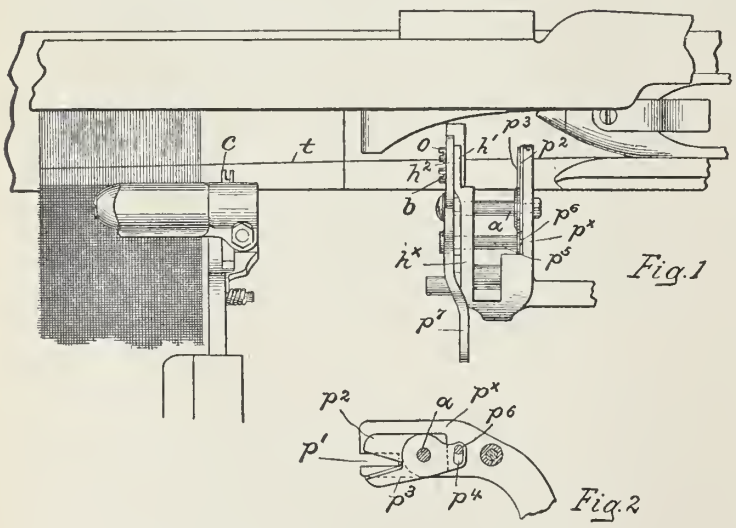


Fig. 1



Fig. 2

By the mechanism described in the article on pages 37-38, the arm $p^7$ is raised, placing the holding and cutting mechanism in position to receive the filling thread $t$, which enters between the jaws and blades of the cutter. The lug $p^5$ is next depressed and acts to close the two holding jaws before the part $p^6$ of said lug has engaged the bottom of the slot $p^4$ of the cutter blade $p^3$, so that the filling is engaged and held by the holding device before it is severed by the cutting blades. This prevents the filling from twisting out of range of the holding device as it would be apt to do if it were severed before being held firmly. As soon as the thread is firmly held, the cutting blades then operate to sever the thread as near as possible to the shuttle, then as the mechanism resumes its normal position, it moves the jaws and the filling thread held by the same forwardly so that the thread comes in contact with the cutter blade $c$ on the thread cutting temple previously referred to, thus severing the remaining portion of the thread close to the selvage, the portion of the thread thus severed being held between the jaws of the cutter, as previously described, until the operation is repeated, when the jaws open, thus releasing this portion of thread.

Another construction of the thus described cutting and holding mechanism is shown by illustrations Figs. 3, 4 and 5, of which Fig. 3 is an inner side elevation of the thread clamp and cutter in position to act upon the thread when the transferrer is operated to effect a change of filling, the lay being shown on its forward beat. Fig. 4 is a sectional detail of the thread cutter and Fig. 5 is a side elevation of the device which operates to open the clamp and the cutter as they are moved in opposition to act upon the filling thread.

A sharpened blade $p^2$ is secured to the inner face of the arm $y$, with its sharp edge just above the bottom of the notch $p'$, while a movable blade $p^3$ is mounted to rock on a stud 1, fixed in and extended laterally from the inner side of the arm $y$, said blade being slotted at $p^4$, a stud 2 being inserted in said slot, permitting rocking of the blade, said blade also having a depending heel $p^5$ at its front end. A lug $p^6$ extends laterally from the movable blade near its heel, and the said blade moves in a guide 3, secured to the arm $y$, said guide forming a housing for a spring detent $p^7$, adapted when the blade is in normal open position to catch over its upper corner 4, the detent yielding when the blade is positively moved into position to coöperate with the fixed blade $p^2$ to sever filling between them. A pin 5 extends across the notch $p'$ near its botton to prevent the filling thread from passing too far toward the base portion of the jaws. The stud 1, and the stud 2 as rigidly mounted in the arm $y$ and extended laterally therefrom parallel to the stud 1, serve as supports for the fixed member or jaw of the thread clamp.

The stud 1 is extended through a hole in the web, (not seen in the illustrations,) and the latter is maintained against the head of the stud by a spring interposed between the web and a washer bearing against the inner face of the movable jaw $p^3$ of the cutter. The spring thus serves the double purpose of a friction pad for the movable blade, maintaining it open or closed, and to maintain the fixed clamp member in proper position, the stud 2 entering a notch in the front end of the web, preventing the latter from rotating on the stud 1. The movable member or jaw of the clamp is made as an elongated thin blade $c$, fulcrumed on the stud 2 and having an extension $c'$ which extends beneath the lateral lug $p^6$, a spring coiled around the stud 2 keeping the blade $c$ normally closed when in inoperative position, its serrated edge $c^2$ at such time resting in a groove of the fixed member or jaw. An upright slot on this fixed member serves to guide the jaw $c$ as it is rocked, and when the movable blade $p^3$ of the cutter is opened, the lug $p^6$ will engage the extension $c'$ of the movable member of the clamp and turn the latter on its fulcrum

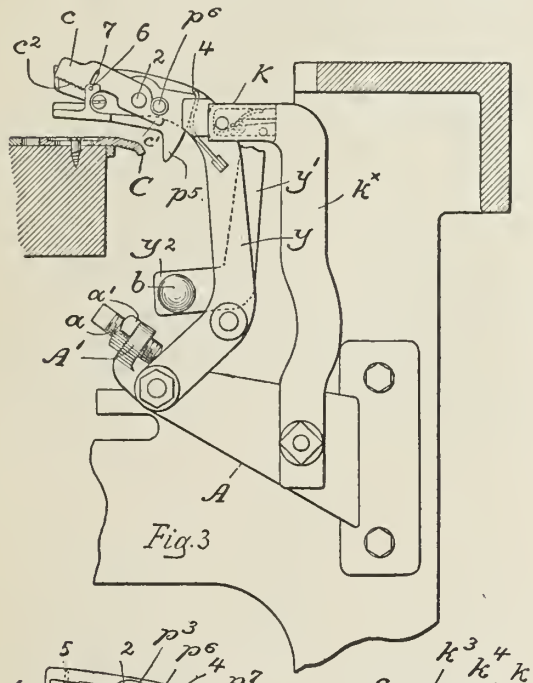


Fig. 3

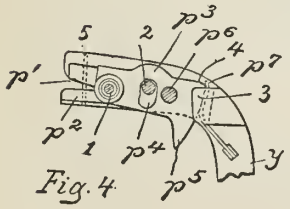


Fig. 4

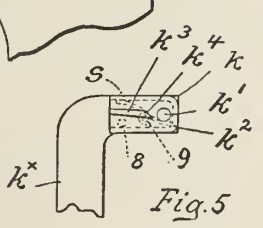


Fig. 5

into relative open position (as shown in Fig. 3). The lug $p^6$ forms a differential connection between the two movable members, since the movable member of the clamp will not be moved to open the clamp until after the blade $p^3$ has been opened and moved far enough to bring the lug $p^6$ into engagement with the extension $p^7$. Conversely the jaw $c$ will close upon its coöperating fixed member before the blades $p^2$ $p^3$ will operate to sever a thread between them. A pin 6 in the lateral extension of the fixed member or jaw of the thread clamp crosses a slot as formed in said lateral extension and passes through a cam slot 7 in the jaws $c$ to limit its movement and prevent accidental displacement.

An upturned arm $k^x$, secured to the bracket A, is bent over at its upper end, as at $k$, and upon the face of said arm nearest the yoke of the filling changing mechanism, is pivoted at $k'$ a box like support or carrier $k^2$, having secured to its side a cam lip $k^3$ inclined on its under side toward the lay and slightly beveled at its end toward the lay, as at $k^4$, a spring $s$ (see dotted lines, Fig. 5) holding the bottom of the carrier $k^2$, up against a stop lug 8, the coil of the spring being supported by a pin 9, fixed in the overhanging end $k$ of the upright arm $k^x$.

After the thread cutter and clamp have operated and returned to normal position a reduced end of the lug $p^6$ on the blade $p^3$ wipes over the top of the switch cam $k^3$ and depresses the carrier $k^2$ until the end of the lug snaps past the switch cam as the parts attain their normal position, the spring $s$ returning the carrier $k^2$ to such position and elevating the switch, so that when the yoke of the filling changing mechanism is swung toward the lay prior to the next change of filling, the lug $p^6$ will travel along the under face of the switch $k^3$, and as the latter is held from upward movement by the action of the stop 8 on the carrier $k^2$ the switch will operate to depress the lug $p^6$ as it travels along the under face of the switch to first open the cutter and thereafter to permit the spring previously referred to as coiled around the stud 2, to open the clamp, so that the latter will be in the position shown in Fig. 3 as the lay nears its forward position, and when the heel end $p^5$ of the blade $p^3$ is so depressed, the detent $p^7$ will engage and hold said blade in such position until positively moved therefrom.

The closing of the clamp and cutter is effected by means of a bunter C, secured to the lay and adapted to engage the heel $p^5$ of the movable member of the cutter as the lay completes its forward movement. Such engagement with the heel operates to release the blade from the detent $p^7$ and permits the spring previously referred to as coiled around the stud 2, to close the jaw $c$ upon the thread before the movable blade of the cutter coöperates with its relatively fixed fellow to sever the filling thread between the clamp and the shuttle then in the shuttle box. The action of the filling supplying mechanism for operating the cutter and jaws is the same as described in article on pages 37-38.

The movement of the yoke of the filling changing mechanism toward the lay is regulated by a set screw $a$, mounted in an ear A' of the bracket A, a lock nut $a'$ holding the screw in adjusted position, the yoke engaging and being stopped by the screw when its proper operative position is attained, as shown in Fig. 3.

The arm $y'$ of the yoke is secured to the other arm $y$ by a bolt $b$, extended through an ear $y^2$ on the arm $y$ and through a slot in the elbow of the arm $y'$, so that the latter can be by this construction adjusted relatively to the arm which forms the support for the thread cutter and clamp. *(Draper Co.)*

## JOY'S THREAD CUTTER FOR NORTHROP LOOMS.

The object of this device is to sever the ends of the filling as left outside the selvage each time a transfer of filling is made. The device is applied to the temple and is shown in Fig. 1 in its side elevation, in normal position. Fig 2 is a sectional view of the device in position to be operated.

The slide bar B of the temple stand having the pod $B^1$, is slotted at $a$ to receive a steel blade $a^1$ and

the cutter (shown in dotted lines) is slotted to straddle said blade and present two arms (only one of which $c^1$ being shown), each having a hook $c^3$, said hooks being projected through the slot $a$ by a spring $d$, which tends to elevate said hooks, as is shown in Fig. 2. A stud $a^1$, extended laterally from the bar B, receives the coil of the spring $d$, one end of which bears against a part of the bar while the other free end $d^3$ engages a projection $c^5$ on the depending heel $c^4$ of the cutter (shown as previously mentioned in dotted lines), the heel being thickened at its lower

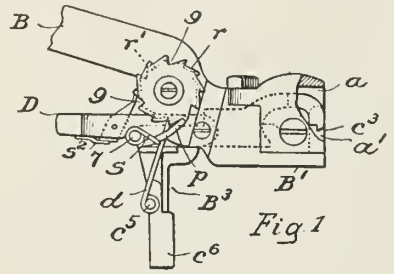


Fig 1

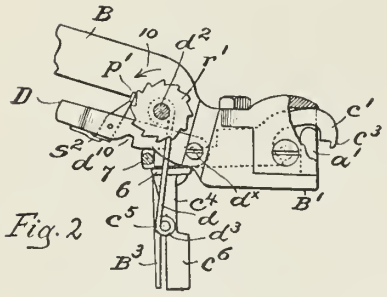


Fig. 2

end at $c^6$. Stops on the cutter limit its forward movement, and a shoe 6 slides and rocks on a stud like extension 7. On one of the stops on the cutter is mounted a pawl $p$, held by a spring $s$ in engagement with a ratchet wheel $r$, rotatable on the stud $d^2$, each outward movement of the cutter rotating the ratchet $r$ one tooth. A second ratchet $r^1$ is rotatably mounted on the stud $d^2$, against a collar thereon, a spring acting as a friction device to prevent overrunning of the ratchets, the inner one, $r^1$, having coöperating with it a holding pawl $p^1$, mounted an a detent D, pivoted at $d^x$, and having a notch $d^{10}$ to engage the extension 7 and retain the cutter retracted against the action of the spring $d$, as shown in Fig. 1, a spring $s^2$ acting to keep the pawl $p^1$ in engagement with its ratchet. The ratchets $r$, $r^1$, have the same number of teeth, but the ratchet $r^1$ is the smaller in diameter, as shown in Fig. 1, every fourth tooth of the ratchet $r$, as herein shown, being cut down to the root line of the teeth of ratchet $r^1$, as shown at 9, Fig. 1, so that whenever the actuating pawl $p$ engages a deep tooth it will also engage and rotate the ratchet $r^1$ one tooth in the direction of the arrow 10 (see Fig. 2), the pawl being broad enough to extend across both ratchets.

The breast beam is provided with a releasing arm which, as the lay beats up first engages the heel $c^4$ of the cutter, moving it rearwardly and at the same time depressing its hooked end $c^3$, so that the filling end will be caught and drawn across the blade $a^1$ to sever it, before the heel $B^3$ is engaged by the lay.

When the lay moves back, the spring $d$ returns the cutter to the position shown in Fig. 2, turning the ratchet $r$ one tooth, the lifting of the detent D when released bringing its pawl $p^1$ into engagement with a tooth of ratchet $r^1$ to maintain the detent inoperative until after a certain number of successive operations of the cutter, the ratchet $r$ will have been turned far enough to permit its actuating pawl $p$ to also engage the ratchet $r^1$, and rotate it far enough to disengage the detent, so that it returns to operative position, the stud 7 entering the notch $d^{10}$ of the detent at the next back stroke of the cutter and the latter will be maintained inoperative until the releasing arm is again actuated to withdraw the detent. By permitting the cutter to operate several times whenever liberated, it has ample opportunity to engage and cut the filling end, should it fail to work properly the first time. *(Draper Co.)*

## MASON'S THREAD CUTTER FOR NORTHROP LOOMS.

This cutter works on the plan of a scissor, one section of which forms a grid embedded in the lay; the other section, consisting of two depressing members and a cutter blade, being operated to move from a vertical to a horizontal position, thus severing the protruding ends of the filling.

Fig. 1 is a section of a portion of a loom taken transversely to the lay, having the cutter attached. Fig. 2 is a perspective view of part of said cutter.

Examining Fig. 1 we find lever $a$ being notched at one end $a^1$ secured at its other end to the shaft $d$ which is fastened to the breast beam. This lever $a$ is operated from the filling supplying mechanism. When the filling is running properly said lever $a$ is out of action, but when called in action on account of change of filling it is raised, the notch $a^1$ coming, on the inward movement of the lay, in contact with the notched end $b^1$ of a short lever $b$ secured to a rod $c$, and which in turn operates levers $e$ and $g$, the latter being adjusted to the cutting knife $h$ at $h^x$.

The cutter, properly speaking, consists of three parts, a grid $m$ countersunk into the lay, and the depressing members $h^1$ being two blades, between which the actual cutter blade $h$ operates. The object of the two depressing members $h^1$ is twofold; when the pro-

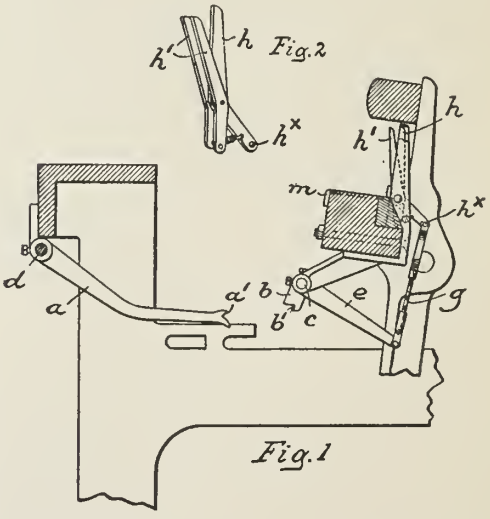


Fig.1

truding end of filling lays over the grid $m$ said members sink into the two outside grooves of the grid, thus holding the end taut, the continued forward movement of the lay closing the blade $h$ against the stretched thread, thus severing it. *(Draper Co.)*

## LOCATING SHIPPER HANDLE AND BELT PULLEYS IN COTTON LOOMS.

While it is customary to locate the belt fork or shipper and the shipper handle at the same side of the loom—the usual practice—it is desirable at times to locate the shipper handle at one side and the belt fork or shipper at the other side, and in the article on this subject on page 165 of "Textile Machinery Part I" a construction is shown whereby such object is attained. In that arrangement a spring is employed to move the shipper in one direction, movement in the opposite direction being effected by or through a flexible connection between the shipper and the shipper handle.

This present construction is an improvement on said construction, whereby the spring is dispensed with and the shipper actuated in both directions by a positive connection with the shipper handle.

Fig. 1 is a vertical side elevation of a portion of a loom, embodying the device with the belt fork and shipper handle at the same side. Fig. 2 is a plan view of a portion of a loom, showing the application of the device when the shipper handle is at one side and the belt fork or shipper at the other side of the loom.

A indicates the loom frame, A′ the breast beam, B the lay crank shaft, B′, B², the fast and loose pulleys respectively, on said shaft, and Bˣ the pinion.

Referring first to Fig. 2, the plate $c'$ is extended from one side of the loom, having a slot $c^2$ and notch $c^3$, the slot receiving the upper end of the shipper handle $b$, fulcrumed on a bracket or stand $b'$, secured

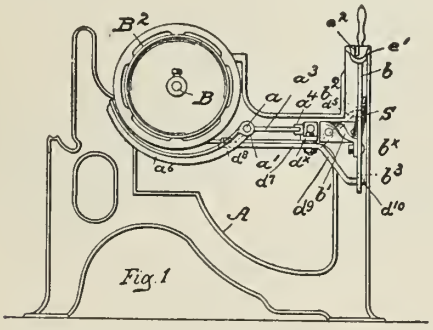


Fig. 1

to the loom side. At the opposite side of the loom a stud $a$, projecting therefrom, receives a sleeve $a'$, carrying the belt fork $a^2$, an arm $a^3$ on said sleeve traveling in a guide $a^4$ on the loom side. The sleeve $a'$ has a stud $a^5$ thereon to engage one end of a bent rod $d$, extended through an opening in the loom side, and a link $d^1$ is rigidly secured to said bent rod at its inner end, by set screws 2. The link is extended across the loom and through the opposite side frame and pivotally attached at $d^2$ to one end of a lever $d^3$, fulcrumed at $d^4$ on a stand $d^x$, secured to the loom side. At its front end the lever $d^3$ is bent up at $d^5$, and its reduced extremity $d^6$ is loosely inserted in a slot $b^2$ above the fulcrum $b^x$ of the shipper handle $b$.

When the shipper handle is released from the holding notch $c^3$, its spring S (see Fig. 1) will throw it into the position shown in Fig. 2, and through the lever $d^3$, link and rod, the belt fork $a^2$, will be positively moved to shift the belt onto the loose pulley B². Movement of the shipper handle into running position will positively move the belt fork to shift the belt onto the fast pulley B′.

Turning now to Fig. 1, the fast and loose pulleys are shown at the same side of the loom as the shipper handle $b$, the loose pulley B² outermost, and the stud $a$, a sleeve $a'$, and belt fork $a^6$, with the guide $a^4$, are also at the same side of the loom as the shipper handle. The bracket $d^x$ has pivoted thereon a lever $d^7$, pivotally connected at $d^8$, with the sleeve $a'$; but in this instance the front end of the lever is down-

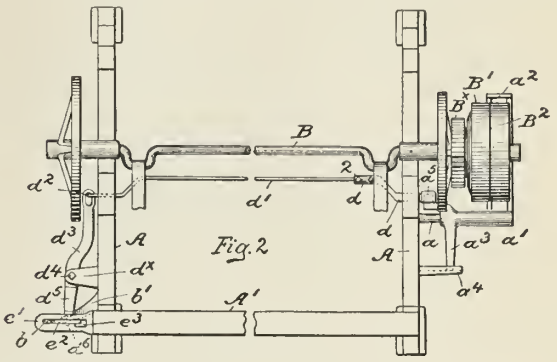


Fig. 2

turned at $d^9$, its extremity $d^{10}$ being extended into a slot $b^3$ in the shipper handle, below the fulcrum of the latter. Such difference in the point of connection between the lever and the shipper handle will now cause the outer end of the lever to be swung inward when the shipper handle is released from the notch $c^3$, to operate the belt fork, instead of being swung outwardly, as in Fig. 2. This change is necessitated by the opposite movement of the belt fork to shift the belt to the loose pulley B², which in each instance is outside of the fast pulley B′, as usual.

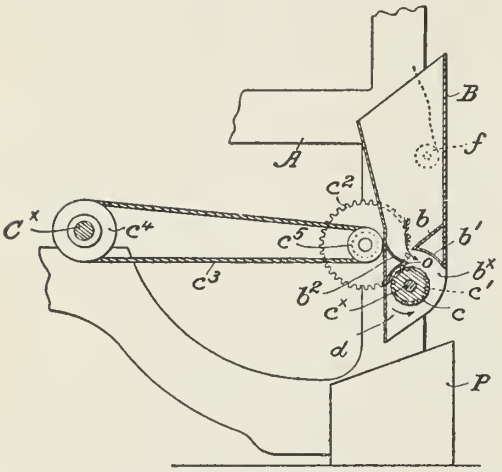
To adapt the mechanism from the construction shown in Fig. 1 to that shown in Fig. 2, the connecting rod $d$ and link $d'$ are interposed between the belt fork sleeve $a'$ and the lever on the loom side, and the lever $d^3$ $d^5$ (shown in Fig. 2) may be also used by merely turning it upsidedown, as shown by dotted lines, Fig. 1. *(Draper Co.)*

## DEVICE FOR REMOVING WASTE YARN FROM FILLING CARRIERS.

This device refers more in particular to Northrop looms where the ejected filling carriers usually have a little yarn remaining upon them, as in some looms of this type, the change of filling is purposely effected while there is some yarn still on the ejected filling carrier. Such filling carriers must be stripped of the yarn so remaining upon them, and what until now had to be done by hand. To clean these filling carriers automatically is the object of the device, shown in the illustration, in elevation and partial section, in connection with that part of a loom to which the same is adjusted.

The device is mounted on the loom side A at that side of the loom adjacent the filling changing mechanism. A stand secured to the loom frame, supports an upright hopper B, into the open top of which the ejected filling carriers $f$ (see dotted lines) pass, the said hopper having at or near its delivery end a contracted delivery throat $b^x$, the upper concave wall $b'$ thereof extending from the lower edge of an inclined shelf $b$ to the outer wall of the hopper. The lower or opposite wall of the throat is formed in part by a rotatable roll $c$, mounted on a stud $c^x$, attached to the stand as secured to the loom frame, said roll extending across the hopper. Above the roll, on the inner side of the hopper and completing the throat wall, there is located a combined guard and guide, shown as a concave plate $b^2$, the edge $o$ thereof clearing the top of the roll and being below the edge of the shelf

$b$. A pinion $c'$ on the roll $c$ is in mesh with a gear $c^3$, rotated from the continuously rotating shaft $C^x$




of the loom through an endless belt $c^3$ and sheaves $c^4$ $c^5$.

When the ejected filling carrier $f$, enters the hopper, it is directed by the shelf $b$ and guide $b^2$ into the throat $b^x$, through which it passes to a box or receptacle P. As it passes the stripper $c$, which is rotated in the opposite direction to the movement of the filling carrier, (see arrow $d$,) the loose end of the yarn remaining on the filling carrier will be caught by and wound upon the stripper $c$, and consequently unwound from the filling carrier. This engagement of the yarn by the stripper refers to such filling carriers as have been ejected with loose ends. When the nearly exhausted filling carrier is ejected the end of the yarn is usually held by the cloth, so that the filling carrier will drop into the hopper and through its throat. When the yarn is severed by a thread cutter, the loose end will naturally fall within the hopper, so as to be caught by the stripper and wound upon it. In either case the device is operative, and when the stripper is full, the collected waste yarn can be readily removed, the stripper being made tapering in order to facilitate such removal of yarn therefrom.

The plate $b^2$ coöperates with the shelf $b$ in guiding the filling carriers into the throat of the hopper, and it also serves as a guard to prevent passage of a filling carrier behind the stripper. *(Draper Co.)*

## SUPPLEMENTAL MECHANISM FOR KNOWLES DUCK LOOMS.

The object of the mechanism is to prevent any bending or back spring of the lay intermediate its connections with the crank shaft when the lay is in its forward position.

Fig. 1 is a rear perspective view of portions of a loom with the mechanism applied thereto, and Fig. 2 is a plan view on an enlarged scale of the supplemental mechanism shown in Fig. 1.

1 indicates the end or side of the loom, 2 the loom center, 3 the driver shaft, 3' the driving pinion, 4 the bottom shaft, 4' the crank shaft, 5 and 6 intermediate gears, 7 the crank connector, 8 the lay, 9 one of the lay swords, secured at its lower end on a rocker shaft 10, 11 the hand rail and 12 a portion of the reed.

On the bottom shaft 4 is fast a gear 13, which meshes with a gear 14, fast on a short shaft 15, journaled in bearings 16 on the cross girth 17 and loom center 2. (See Fig. 2.) On the end of the shaft 15 is fast a crank disk or wheel 18, and on the pin or stud 19 there is loosely mounted a roll 20. A lay sword 21, located intermediate the end lay swords 9, is secured at its upper end to the rear portion of the lay 8 and secured at its lower end on the rocker shaft 10 and has a curved or cam surface 22 thereon, which is made removable and adjustable by bolts 23, and is so arranged relatively to the roll 20 on the crank disk 18, and the revolution of said disk is so timed that when the lay is very near its forward position on its forward stroke, the roll 20 will be back of and ready to engage the curved or cam surface 22 on the center lay sword 21, and if there is any bending or back spring of the lay as it beats up, the roll 20 will engage the cam surface 22 and push forward the lay and bring it into alignment when the lay is at its extreme forward movement, thus beating up the cloth in a straight line the full length of the lay.

In the ordinary weaving of the loom, in case there is no back spring of the lay, the roll 20 may be carried around with the disk 18 and pass by the cam surface 22 on the stand 21 on the forward stroke of the lay without any engagement therewith.

By the construction of the new mechanism the roll 20 is in position to engage the cam surface 22 on the

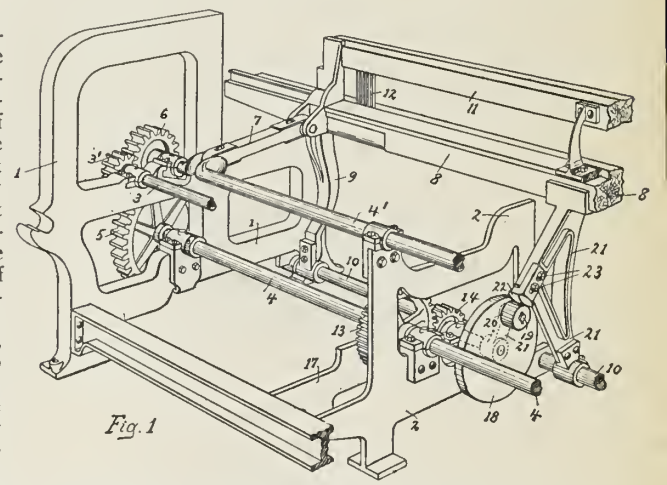



Fig. 1

stand 21 only during a portion of a revolution of the disk 18, and during the rest of the revolution of said disk there is no engagement or possibility of engagement between the roll 20 and the cam surface 22, thus reducing friction on the parts and consequent loss of power.

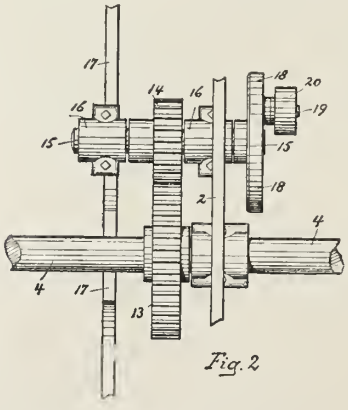


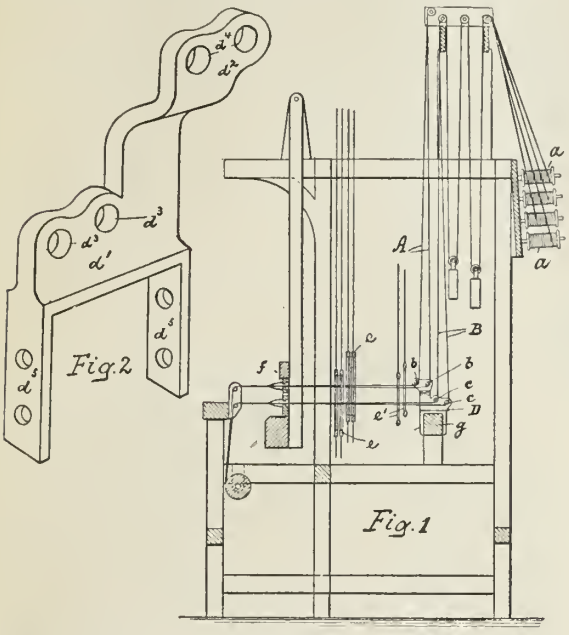

Fig. 2

Only one center lay sword 21 and one crank disk or wheel 18 and engaging roll 20 are shown in Fig. 1; but there can be one or more on the loom, according to its width.

For a change in construction a crank arm carrying the roll 20 may be used in place of the disk or wheel 18, as indicated by dotted lines 21 Fig. 1. The roll 20 may be dispensed with and only a pin or stud used. *(Crompton and Knowles Loom Works.)*

## GLASS BEAM BRACKET FOR RIBBON LOOMS.

These brackets are for the support of the glass bars in double deck batten ribbon looms. The upper and lower shuttle races in these battens are out of alignment vertically, and the object of the bracket is




such, that its glass beams will not interfere in position with that of the warp threads. To this effect the bracket is so constructed that its upper bearing is vertically out of alignment with its lower bearing, the distance between the bearings corresponding substantially to the distance between one of the upper shuttle race spaces and the neighboring lower shuttle race space of the batten. This produces a free disposition and run for the warp thread, besides permitting the shuttle races to be placed nearer together, in consequence of which increasing the output of a loom.

Fig. 1 is a vertical transverse section of part of a ribbon loom showing this bracket, which is shown separate in its perspective view, enlarged, in Fig. 2, so as to clearer show its construction.

*a* represents the warp spools of a ribbon loom, *b c* the upper and lower glass rods, *c'* the back reeds, *e* the harness and *f* the double deck batten, provided with two rows of shuttles, the races of each row being separated by the narrow spaces which hold the small reeds.

The sets of warp threads A for each of the upper shuttles pass around the upper glass rod or rods *b*, and sets of warp threads B for each of the lower shuttles pass around the lower glass rod or rods *c*, the sets on the upper glass rods breaking line with those on the lower glass rods and the unburdened spaces of the rods between the sets of warps breaking line correspondingly. These unburdened spaces are utilized for receiving the intermediate brackets D, that support the glass rods, which must be supported at several points along their length, because they must withstand the entire pull of the weighted warps.

To adapt the brackets to these spaces, they are made of the peculiar form shown in Fig. 2, in which the upper section or offset $d^2$ is brought vertically out of alignment with the lower section $d'$ by means of a lateral bend in the bracket and is set forward of the lower section so as to clear the lower warp threads. The lower section $d'$ is provided with one or more perforations $d^3$ for receiving the lower glass rod or rods *c*. At its forward end the section $d'$ is extended upwardly and laterally to form the upper section $d^2$, having one or more perforations $d^4$ for receiving the upper glass rods *b*. Thus the bearings $d^4$ for the upper rods *b* are brought vertically out of alignment with the bearings $d^3$ for the lower rods *c*. A pair of arms $d^5$, depending from the bracket, serve to fasten the same to supporting beam *g* of the loom. *(W. W. Uhlinger, Paterson, N. J.)*

## BENTLEY'S MEASURING DEVICE FOR LOOMS.

Fig. 1 is a plan view of the device. Fig. 2 is a plan view of the interior of the device, the upper section of the casing being partially removed and partially in section. Fig. 3 is a vertical longitudinal section on the line 4-4 of Fig. 2, and Fig. 4 is an end view of the device. The device is secured upon the upper portion of the breast beam, and consists of a casing made in two sections—a base section E, and a top or cap section E'.

The base section E of the casing is provided with a stud 10, extending up from its bottom through the cap section of the casing E'. The base portion of the base section E of the casing is further provided with apertures 11, adapted to receive screws whereby the device is attached to the breast beam of a loom.

At one side of the base section of the casing E, at the top, a bearing 12 is provided, (shown in Fig. 2,) in which a shaft 13 is mounted to turn, the said shaft being also journaled in the casing proper, and between the bearing 12 and the wall of the casing in which the shaft 13 is journaled, a worm wheel 14 is secured to the said shaft 13, as is likewise shown in Fig. 2.

At one end of the shaft 13—the end that is opposite that carrying the worm wheel 14—a gear wheel 15 is secured. The base section E of the casing is provided with a foot 16, the top portion of which is convexed and the bottom flat, as shown in Figs. 2 and 4. This foot extends out from that portion of the base section of the casing in which the gear wheel 15 is located.

The top or cap section E' of the casing extends beyond the side where the gear 15 is located and over the foot 16. In that portion of the cap section E' of the casing adjacent to the gear 15 and which is over the foot 16 a shaft 17 is journaled, and this shaft is provided with a pinion 19, arranged to mesh with the gear 15, the shaft being also provided with a friction wheel 18, which friction wheel extends downward outside of the base section of the casing and over the foot 16. Too free a rotary movement of the friction wheel 18 is prevented by set screw $19^a$ acting against one journaled end of the shaft 17. 20 indicates the registering wheel adapted to turn loosely on the stud 10, the said wheel being provided with an upwardly extending hub 21, and a fastening device F is provided for the registering wheel, which consists of an inverted **U**-shaped arm 22, which extends over the top of the hub 21 of the registering wheel, and a pin 23, secured to one depending member of the said arm, which pin is passed through an opening $23^a$ in the upper portion of the hub 21 and is engaged with the top of the stud 10, as illustrated in Fig. 3.

The free depending member of the arm 22 serves as a check to prevent the removal of the pin 23 from the hub 21. A plate spring $20^a$ is affixed by one end on the lower surface of top plate of the casing E, the free end of said spring having contact with the upper surface of the registering wheel 20.

When the device is to be put into service, the registering wheel 20 is drawn upwards by manipulation of the arm 22, which is moved longitudinally, so as to locate the pin 23 over and in contact with the convex upper end of the stud 10, as shown in Fig. 3.

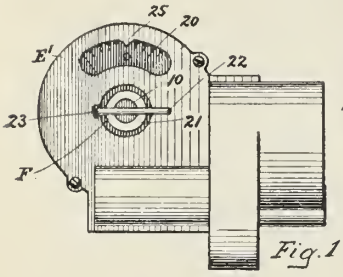


Fig. 1

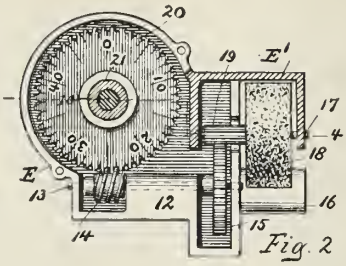


Fig. 2

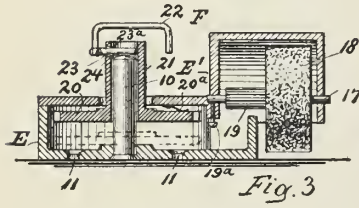


Fig. 3

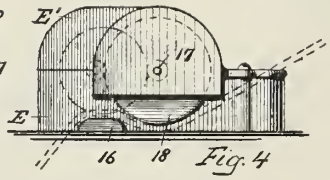


Fig. 4

It will be seen that the resilience of the spring 20a, coacting with the pin 23, will hold the registering wheel 20 in meshing engagement with the worm wheel 14 and produce but slight frictional resistance to rotation.

When the full number of yards in a piece of cloth has been indicated by the registering wheel 20 and a new piece of cloth is to be measured, the locking device F is moved so as to free the pin 23 from the top of the stud 10, whereupon the registering wheel will drop to the bottom of the base section E of the casing and the wheel can be turned so as to bring zero to a proper point or opposite an indicating point 25, formed in the wall of a slot made in the upper casing, as shown in Fig. 1, whereupon the locking device is again placed in position to hold the registering wheel in mesh with the worm wheel 14.

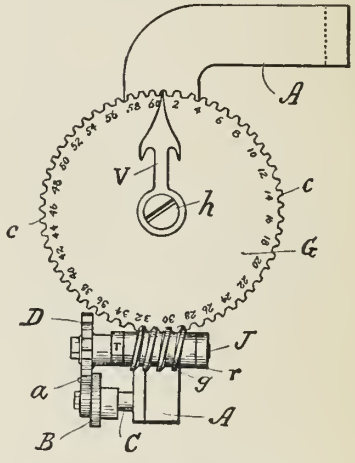
The device is placed as close as possible to the point where the selvage edge of the fabric leaves the loom. As is indicated in Fig. 4, the selvage edge of the fabric is placed in engagement with the bottom portion of the friction wheel 18 and over the foot 16, the movement of the cloth to the winding roller of the loom being the power which operates the friction wheel, and the friction wheel with the chain of gearing before described communicates movement to the registering wheel. *(Alfred and John Bentley, Paterson, N. J.)*

## JENSEN AND COMAR'S MEASURING DEVICE FOR LOOMS.

The illustration shows a front elevation of the mechanism of this measuring device.

A indicates a bracket that is attached to the loom frame at its upper end by a bolt, at the lower end of which a short horizontal shaft C is held in a bearing, and a friction wheel B is made fast in the inner end of the shaft C, with a pin *a* inserted in the side of the wheel B. Another shaft J is held in bearings a little higher up on the bracket A than the shaft C, and a toothed wheel D, fast on the inner end of the shaft J, is so held that the pin *a* in the wheel B at each revolution of that wheel catches one of the teeth of wheel D and turns the shaft J a little ways. This shaft J has a worm *g* fast on it between its bearings *r* on the bracket A, which worm engages with the teeth *c* of dial wheel G, held to turn on a stud *h* fast in the bracket A. The dial wheel G has a series of numerals on its face near the edge, for indicating the number of yards of cloth woven. A hand or pointer V is held fast on the stud *h* in position to indicate the figures as the dial is moved.

When the sand roll of the loom (not shown in illustration) is turned to wind the cloth on the cloth roll of the loom (not shown in illustration) the friction wheel B, resting on it, will be turned, and at each revolution the pin *a* in the side of the wheel B, will enter between two of the teeth of the wheel D and will move that wheel one tooth. When the wheel D has made a full turn, the worm *g* will have moved the dial wheel one tooth or one figure on the dial, which will be indicated by the pointer V. The indication of the numbers of yards of cloth woven is regulated by the relative sizes of the sand roll and wheels B, D, G. For example: If the sand roll is one foot in circumference and the friction wheel B one third of that and has nine teeth, each tooth on the wheel G indicates one yard of cloth, which will be shown on the dial; again, if the friction wheel B is one twelfth of a yard in circumference the toothed wheel D must have twelve teeth to obtain the same result.




*(Soren Jensen and John Comar, Providence, R. I.)*

## FISCHER'S NEEDLE LOOM.

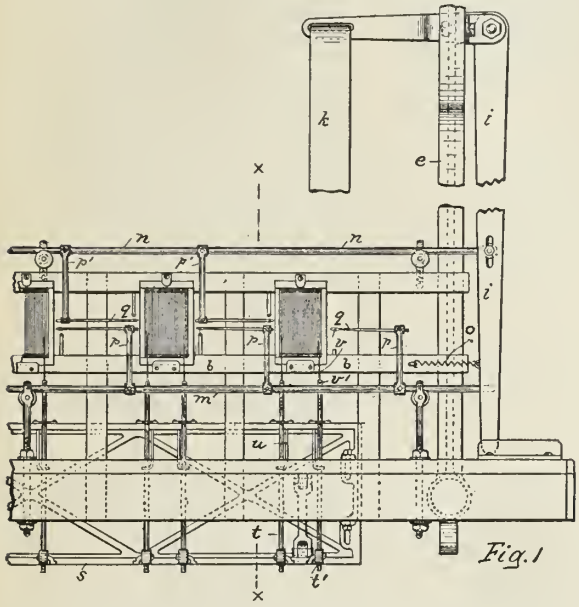
This new mechanism refers more particularly to the needles or "loopers" as used in this class of looms, and has for its object, means whereby these loopers, while reciprocated collectively to enter and quit their respective loops, are individually and independently spring yielding and movable toward and away from their respective reeds, so that each looper may adapt itself to its own particular work.

Fig. 1 is a front elevation of that portion of such a loom showing the needles and lay, only the right hand part of the loom being shown. Fig. 2 is a section, taken on line x-x Fig. 1, through the batten, showing the looper in its elevated position.

The lay swords *c* are fulcrumed at their upper ends in standards as fastened to the upper part of the loom frame, and carry the sets of reeds, filling carriers and loopers, there being one set for each piece of goods woven. The filling carriers are arranged, as horizontal needles *q*, in pairs, the needles of each pair

pointing in opposite directions, one being carried by a horizontal longitudinally reciprocating rod $m$ and the other by a similar rod $n$. The needles $q$ of rod $m$ are secured to their rods by arms $p$, those of rod $n$ being secured thereto by arms $p'$.

The filling is taken from bobbins in the rear of the loom, there being one bobbin for each needle. The needles $q$ are actuated by having their rods $m$, $n$, attached to the picker sticks $i$, the said picker sticks being moved by straps $k$ and the return movement being effected by springs $o$, attached to one of the bars ($b$) as connecting the lay swords. By this arrangement, first one set of needles is operated and



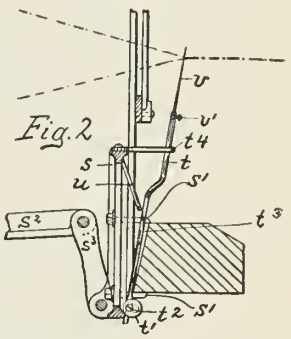

then the other, the shed changing at each reciprocation of either set of needles so as to hold the filling loops deposited by the needles and beaten up by the reeds.

For the purpose of holding the loop carried across the warp by each needle, until said loop is beaten in by its reed, a second set of needles $v$ (loopers) is provided, arranged in pairs, one on each side of each reed. They reciprocate in a plan transverse to that in which the filling carrier needles move, and are arranged and operated to enter and quit each its own filling loop at appropriate times. For this purpose these loopers are mounted on and carried by a frame $s$, situated back of the batten and adapted for vertical reciprocatory movement by guides $s'$, that project rearwardly from the top and bottom of the batten into and through vertical slots in said frame. The reciprocatory movement of the frame $s$ is effected by means of levers $s^2$, one at each end of the loom, and at their free ends connected to the frame $s$ by links $s^3$. Both levers $s^2$ are operated simultaneously by cams on the crank shaft of the loom, these cams operating to lift the frame $s$, the descent of the latter being due to gravity. The movement is timed so that the loopers $v$, which are down when the horizontal filling carrier needles $q$ carry the filling across the warp shed, will rise and enter the filling loops before the filling carrier needles begin to move back, and will thus hold the loops until they are beaten up and the warp shed is changed, at which time they quit the loops and descend to their normal position. In this way all of the loopers are reciprocated to enter and quit their loops collectively and together.

It is, however, necessary that the loopers should be capable of motion to and from their respective reeds, the motion toward the reed being necessary in order to properly beat up the fabric and secure the filling loop in place, and the motion from the reed being necessary in order to enable the loopers to enter their respective loops, at which time the filling carrier needles $q$ are between the loopers $v$ and the reeds.

In order to make the loopers to be capable of movement independently, so that they may adapt themselves to any weave, each of said loopers is made individually spring yielding and movable to and from the reed, so that while all of the loopers reciprocate collectively and as a group to enter and quit their loops, the individual members of that group are separately and independently movable in a direction to and from their respective reeds. For this purpose the needles are adjustably secured by set screws $v'$ in needle bars $t$, adjustably secured by set screws $t^2$ in blocks $t'$, which are pivoted to the lower part of the frame $s$. When thus pivoted, they can swing or move to and from the reed.

With each needle bar $t$ is associated a spring $u$, which tends to hold the needle bar away from the reed, and each bar passes through a guide slot in a three arm guide $t^4$, adjustably secured to the top of frame $s$ by set screws. This guide restrains the needle bar from lateral movement and limits the extent of its vibratory movement to and from the reed. The needle bars $t$ are between the frame $s$ and the batten, and in the latter at points where the needle bars come are wedge shaped clearance slots $t^3$, which have their wide end uppermost, so as to allow the loopers to move away from the reed as they rise far enough to permit them to enter the filling loops.




The looper needles $v$ are plain and without eyes. The filling carrier needles $q$ are provided with eyes, through which the filling is threaded.

When the loom is in operation, one of the filling carrier needles $q$ of each pair enters and passes across the warp shed, so as to lay a loop of filling therein, and projects enough beyond the opposite or far edge of the warp shed to bring the open loop in position to be entered by its appropriate looper needle $v$, the batten at this time being in the rear position. The frame $s$ during this time rises, so that when the loops are in position, the loopers $v$ will enter said loops, and as they rise will, under the influence of the springs $u$, swing forward from the reed far enough to be in position to pass up into the loops on the front side of the filling carrier needles $q$, which at this time are between the loopers and the reed. As soon as the loopers engage their loops the filling carrier needles recede and draw back out of the warp shed, the batten moving forward and the loopers still engaging and holding the loops until the filling is beaten up and the shed changes, at which time the frame $s$ descends far enough to draw the loopers out of their loops. When the frame $s$ descends, the needle bars $t$ will, by the shallow lower ends of their clearance slots be closed up toward the reed, so that at this time the needles $v$ will be substantially vertical; but in rising and before said needles reach their loops they will be permitted to swing forward away from the reed far enough to enter their loops. *(American Automatic Loom Company of New Jersey, Paterson, N. J.)*

## BOBBIN HOLDING DEVICE FOR SHUTTLES.

In this shuttle means are provided by which the raising or lowering of the spindle, respectively, automatically engages or disengages the bobbin.

Figs. 1 and 2 represent top or plan views of this shuttle, showing the new mechanism in both positions. A designates the body of the shuttle, B the spindle, C the head thereof and D the axis of said head. E designates the jaws, which are mounted on said head C by the pivot F, whereby they are permitted to open and close in the direction of the width of the shuttle. The heel or rear ends of the jaws are tapering and have depending ears, which freely enter recesses in the head C, so as to be guided therein as the jaws open and close. Interposed between said ears in chamber K is the spring J, whose tendency is to close the jaws and hold them closed.

L designates shoes which are seated on the recess M in the head C, permitting the shoes to rock on said head. Bearing against the back of the connecting piece N of the shoes is the coiled spring P, which

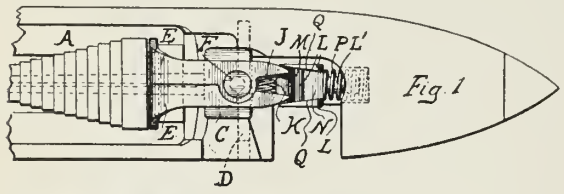


Fig. 1

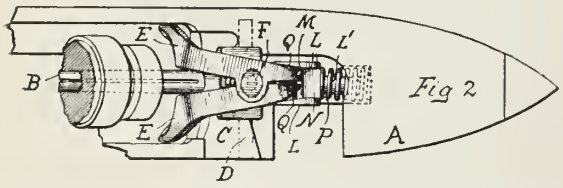


Fig 2

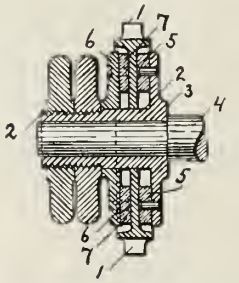
encircles the stem $L^1$ of the shoes L, thus retaining the shoes in position on the head C. The shoes are adjacent to the heel ends of the jaws E and have their inner sides Q inclined, said heel ends being adapted to ride against said faces.

The operation is as follows: When the spindle is raised the heel ends of the jaws enter and ride against the shoes L and are brought together or closed, whereby the jaws separate and are thus open. The spring N now bears downwardly against the wall of the receptacle M, and so holds the spindle in its elevated position. The bobbin is then slipped on the spindle to its full extent, and when the spindle is lowered the heel ends of the jaws then clear the shoes L and the spring J becomes operative, separating the heel ends of the jaws, whereby the latter close on the bobbin and tightly clamp and hold the same. The spring P, which, in a measure, works with the shoes L, now presses upwardly against the wall of the recess N and so holds the spindle in closed position. This construction permits the use of bobbins having broken heads. *(R. Sergeson & Co., Philadelphia.)*

## IMPROVEMENT TO THE TAKE UP FOR CROMPTON SILK LOOMS.

This improvement refers to the take up mechanism described on pages 56-57 and has for its object to provide an additional friction surface to the take up roll, in order to obtain a firmer grip on the sprocket wheel attached to the take up roll, at the same time preventing any slipping.

The illustration is a sectional detail of this friction mechanism on the take up roll.




A chain as fast on a sprocket wheel on the winding up roll (not shown in illustration) passes over the sprocket 1 loose on the hub 2 of a disk 3 fast on the end of a shaft 4 of the take up roll. A friction collar 5 is secured on the inner surface of the disk 3 to bear against the sprocket wheel 1. Upon the opposite side of the sprocket wheel 1 is a disk 6 having a friction collar 7 thereon to bear against the sprocket wheel. These two friction collars turn with the sprocket wheel 1 and rotate the winding up roll (not shown), the two frictions thus produced obtaining a more accurate grip on the sprocket wheel, preventing slipping of said sprocket wheel and take up roll. *(Crompton and Knowles Loom Works.)*

## A NOVEL METHOD OF OPERATING LEASE ROD.

Fig. 1 is a side elevation of part of a loom showing the mechanism applied thereto, and Fig. 2 is a sectional detail view of one of the lease rod supporters, having yielding adjustability, whereby the rod may be readily removed from or inserted in the holders E (one on each side of the loom), as secured in bearings on the loom frame.

On one end of one of the holders is secured an arm G to which is attached a rod H, the same being connected to the lay; thus when the lay moves it gives

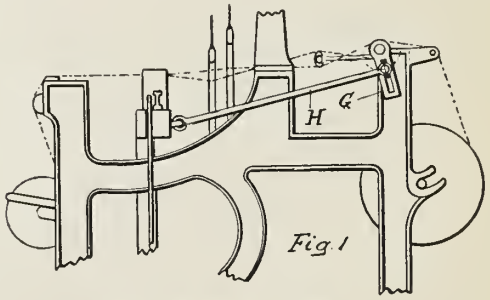


Fig. 1

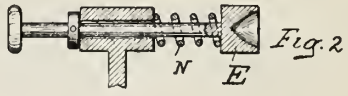


Fig. 2

a partial rotation to the rod. By compressing the spring N the rod can be readily removed or inserted in the holders. The rod H, as shown connected to the lay, may be connected to the driving shaft, giving the same result. *(John P. Kelly Manufacturing Co., Biddeford, Me.)*

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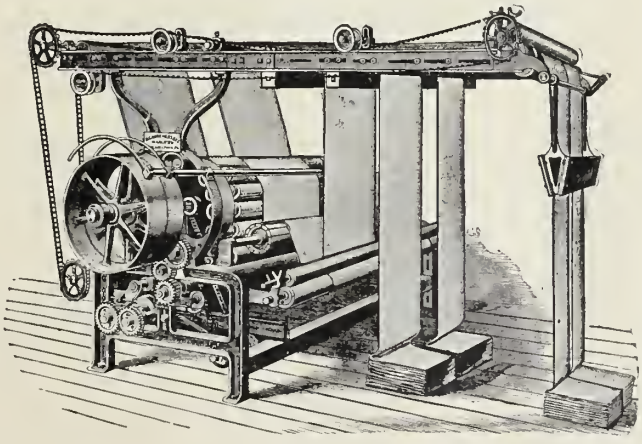

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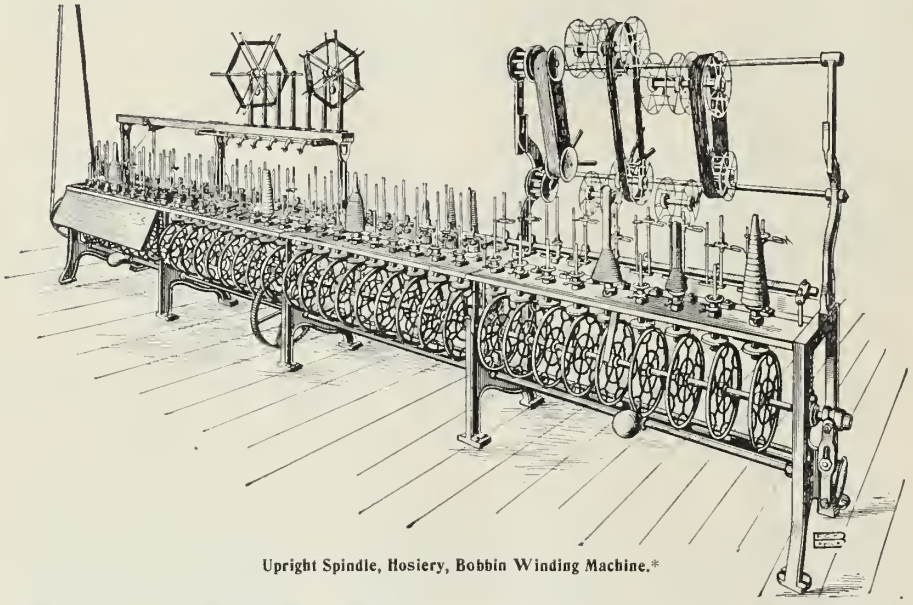

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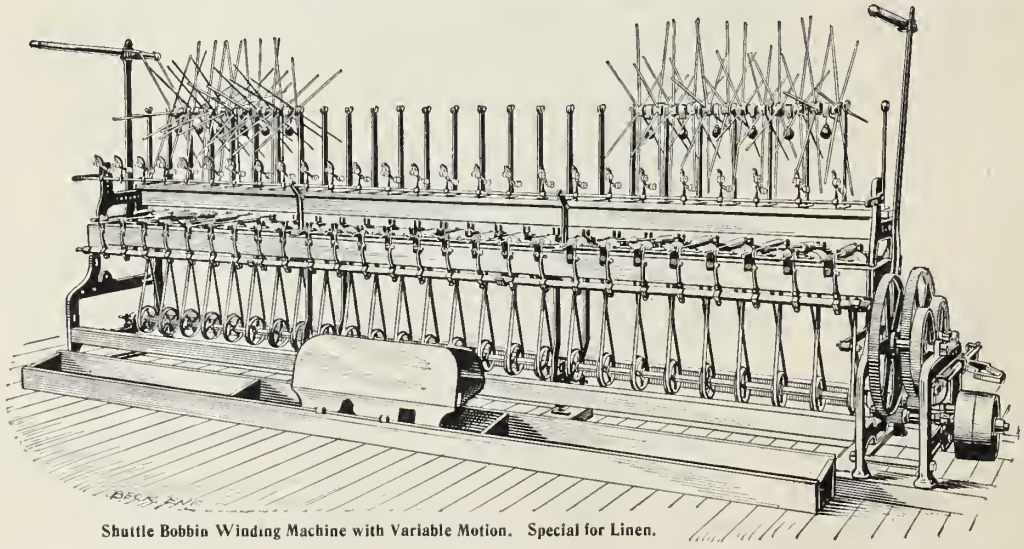

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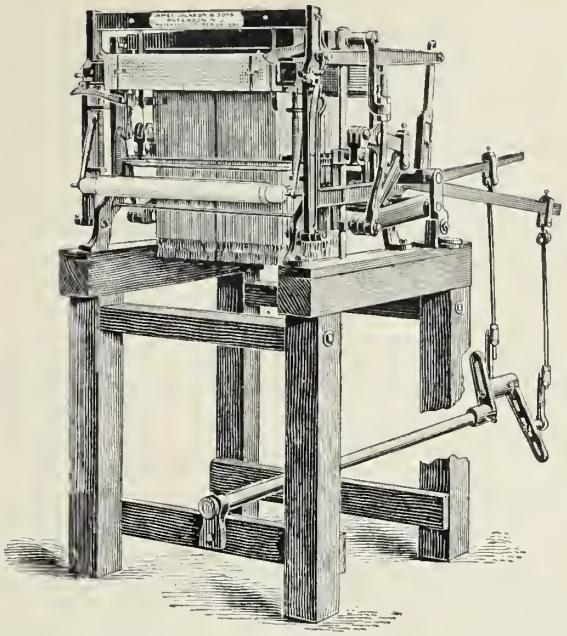

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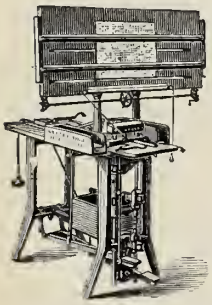

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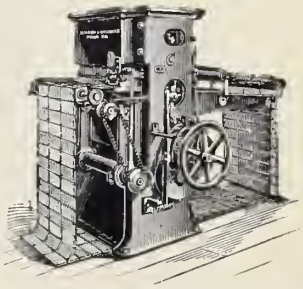

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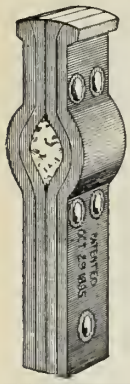

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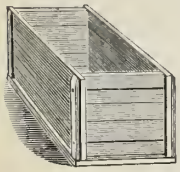

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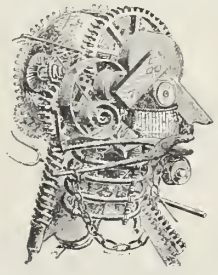

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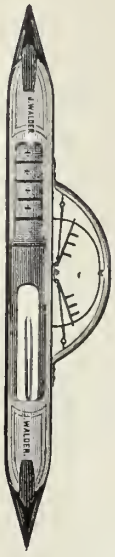


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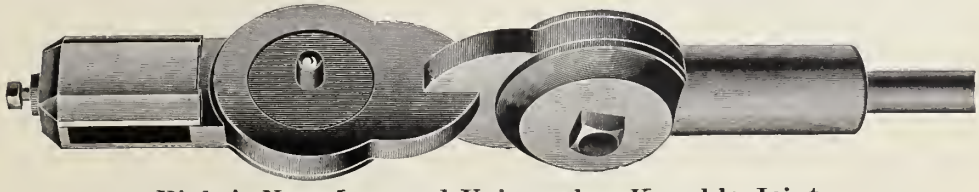

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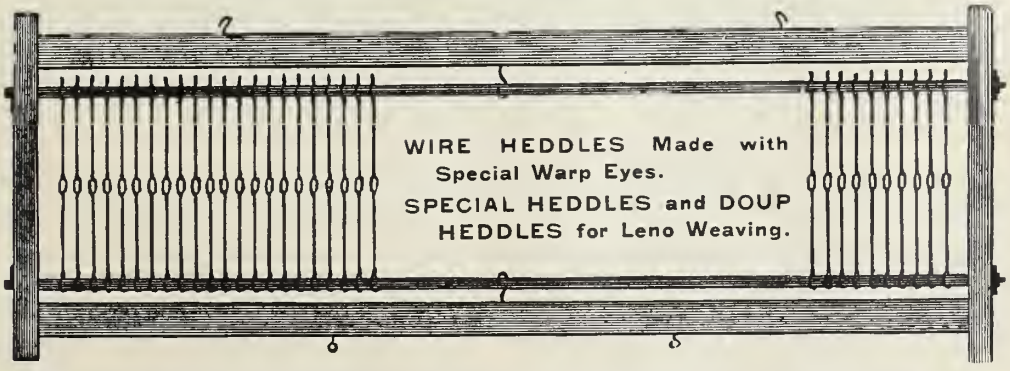


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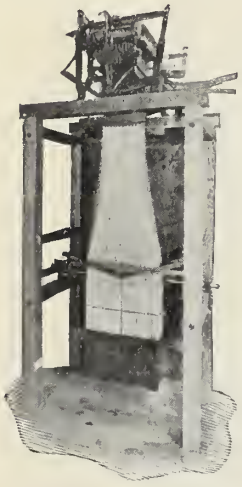

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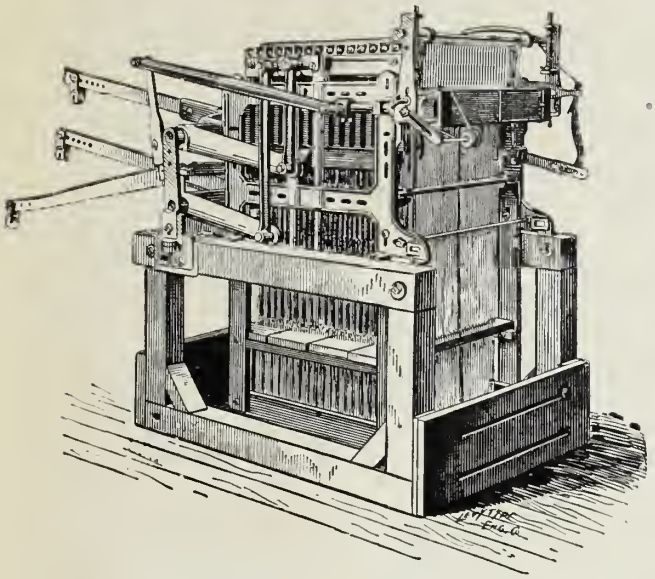

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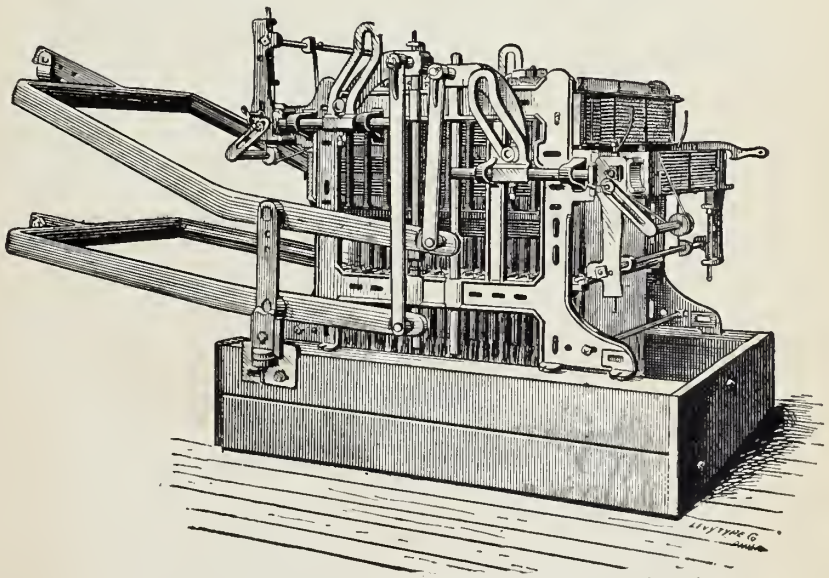

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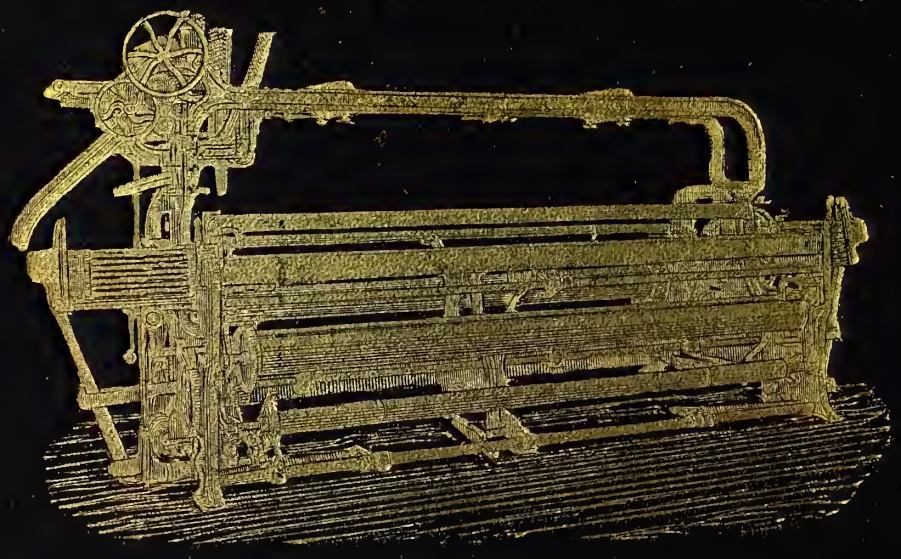
WORCESTER, MASS.

WORKS: WORCESTER, PROVIDENCE, PHILADELPHIA



BUILDERS OF EVERY VARIETY OF

## WEAVING MACHINERY

SEE INSIDE PAGE 2